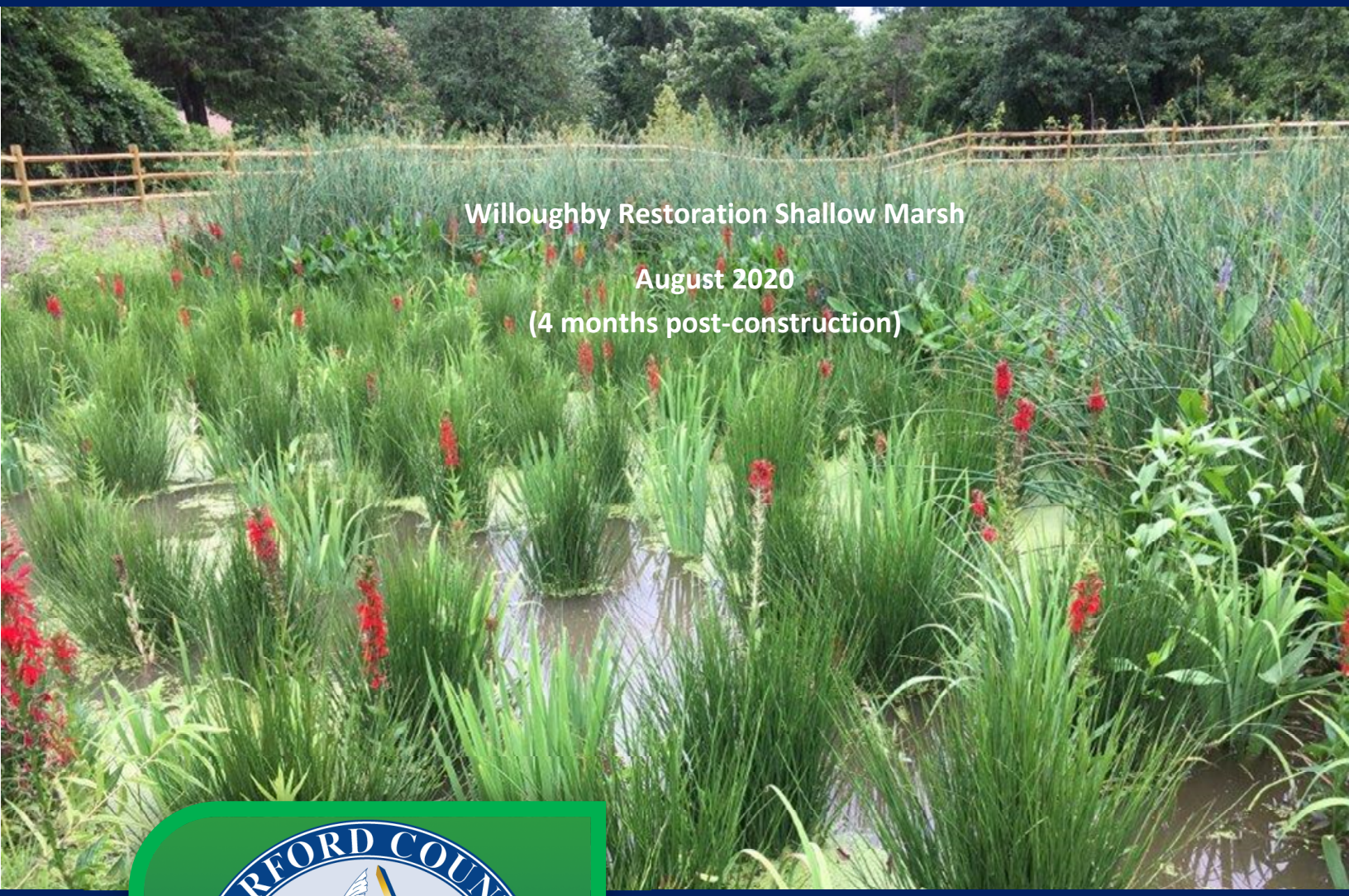
Maryland Department of the Environment
National Pollutant Discharge Elimination System (NPDES)
Municipal Separate Storm Sewer System (MS4)

Permit Number 11-DP-3310 (MD0068268)



Willoughby Restoration Shallow Marsh

August 2020

(4 months post-construction)

Barry Glassman
County Executive

Harford County, Maryland
Department of Public Works
Watershed Protection and Restoration Office

2020 Annual MS4 Report

Page

List of Appendices

Introduction

The Clean Water Act adopted in 1972, established the National Pollutant Discharge Elimination System program, or NPDES for industrial facilities that discharge process wastewater to receiving streams or groundwater. Before discharging processed wastewater, the industrial facility must apply for and receive an NPDES permit.

The 1987 Clean Water Act amendments updated the NPDES regulations to include discharge from stormdrain pipes, or Municipal Separate Storm Sewer Systems (MS4). Jurisdictions nationwide with populations over 100,000 were required to submit a two-phase application for an individual five-year NPDES MS4 permit.

In Maryland, the Maryland Department of the Environmental (MDE) was delegated the program by the U.S. Environmental Protection Agency (EPA). Harford County received its first permit on May 17, 1994 and reissued permits on August 13, 1999, November 1, 2004 and December 30, 2014. MDE has administratively extended the permit and anticipates issuing a new permit to the County in 2021.

As established in the MS4 permit, annual reports are due on the anniversary of the effective date of the permit. The information contained in the annual reports document activities completed towards meeting the requirements of the permit.

This document is the sixth annual report since the issuance of Harford County's MS4 permit on December 30, 2014. The current permit requires annual reports to be submitted for the fiscal year (July 1 through June 30). The reporting period for this annual report is July 2018 through June 2019.

The language from the permit is repeated in this annual report to compare each permit requirement with the activities completed to address the requirement. The permit language is shown within gray text boxes. The remaining text is Harford County's response to each permit requirement.

MARYLAND DEPARTMENT OF THE ENVIRONMENT
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
MUNICIPAL SEPARATE STORM SEWER SYSTEM DISCHARGE PERMIT

PART I. IDENTIFICATION

A. Permit Number 11-DP-3310 (MD0068268)

B. Permit Area

This permit covers Stormwater discharges to and from the municipal separate storm sewer system owned and operated by Harford County, Maryland.

C. Effective Date December 30, 2014

D. Expiration Date December 29, 2019

PART II. DEFINITIONS

Terms used in this permit are defined in relevant chapters of Title 40 of the Code of Federal Regulations (CFR) Parts 122-124 or the Code of Maryland Regulations (COMAR) 26.08.01. Terms not defined in CFR or COMAR shall have the meanings attributed by common use.

PART III. WATER QUALITY

The permittee must manage, implement, and enforce a Stormwater management program (SWMP) in accordance with the Clean Water Act (CWA) and corresponding Stormwater National Pollutant Discharge Elimination System (NPDES) regulations, 40 CFR Part 122, to meet the following requirements:

1. Effectively prohibit pollutants in Stormwater discharges or other unauthorized discharges into the MS4 as necessary to comply with Maryland's receiving water quality standards;

2. Attain applicable wasteload allocations (WLAs) for each established or approved Total Maximum Daily Load (TMDL) for each receiving water body, consistent with Title 33 of the U.S. Code (USC) §1342(p)(3)(B)(iii); 40 CFR §122.44(k)(2) and (3); and

3. Comply with all other provisions and requirements contained in this permit, and in plans and schedules developed in fulfillment of this permit.

Compliance with all conditions contained in PART's IV through VII of this permit shall constitute compliance with §402(p)(3)(B)(iii) of the CWA and adequate progress toward compliance with Maryland's receiving water quality standards and any EPA approved Stormwater WLAs for this permit term.

Harford County recognizes the need to improve water quality in the Chesapeake Bay and local Harford County streams. We also recognize through the MS4 permitting program, the responsibility of local governments to participate in the restoration of our waters.

Harford County, however, has reiterated throughout the permit issuance process, that the permit requirements listed herein exceed Harford County's maximum extent practicable (MEP), considering both limited financial capabilities and short timeframes for implementation. MEP is the legal compliance standard for MS4s established by the Clean Water Act. Additionally, although Part I.B. of the permit correctly defines the MS4 Permit Area, outside of the permit MDE expressed a more expansive interpretation of the regulated permit area.

The County expressly reserves its rights to reduce the acreage associated with the impervious surface area assessment in Part IV.E.2.a. of the permit, which in turn impacts the County's restoration efforts during this permit term under Part IV.E.2.a., to the minimum acreage required by the permit. The County expressly reserves its rights to make refinements to its assessment as necessary in the future based upon new or additional information consistent with an adaptive management approach.

In April 2019, Harford County requested a major permit modification to allow for nutrient and sediment trading in accordance with the Water Quality Trading Regulations finalized on July 16, 2018. On August 22, 2019, MDE held a public hearing and approved the permit modification on November 8, 2019 (Appendix B).

Part IV. STANDARD PERMIT CONDITIONS

A. Permit Administration

Harford County shall designate an individual to act as a liaison with the Maryland Department of Environment (MDE) for the implementation of this permit. The County shall provide the coordinator's name, title, address, phone number and email address. Additionally, the County shall, in its annual report, submit to MDE an organizational chart detailing personnel and groups responsible for major NPDES program tasks in this permit. MDE shall be notified of any changes in personnel or organization relative to NPDES program tasks.

With the issuance of this permit, Harford County has increased both staff and financial capacity for the implementation of the MS4 program.

In order to accelerate permit requirements, Harford County continues to utilize and expand the use of open-end contracts including six consultants under contract for design and assessment, three consultants under contract for monitoring and assessment, six contractors under contract for landscaping and maintenance, and two contractors under contract for design – build. During this reporting period, the County continued contracts for a consultant project manager, a GIS programmer, and a program management assistant. Additional on-call contracts were also continued with Steve Stewart, retired Baltimore County MS4 Program Manager, and consultants from RKK.

The MS4 program is administered through the Department of Public Works Office of Watershed Protection and Restoration, here forward called MS4 staff (listed below) with support from other departments throughout the county government (Appendix A). Additionally, Harford County utilizes various partnerships with outside agencies to accomplish permit requirements.

Department of Public Works
Office of Watershed Protection and Restoration
212 South Bond Street
Bel Air, MD 21014
(410) 638-4109

Joseph Siemek, P.E. (Director, Public Works), (410) 638-3285
Steven Walsh, P.E. (Deputy Director, Engineering & Construction Management), extension 1375
Christine Buckley, P.E. (MS4 Program Manager, **primary liaison**) extension 1176
Michele Dobson (MS4 Monitoring Manager, **alternate liaison**), extension 1247
Laura Coste (MS4 Outreach Coordinator), extension 2448
Vacancy (MS4 Capital Projects Manager)
Laura Mrugalski (GIS Technician), extension 1252
Betsy Collins (MS4 Capital Projects Reviewer), 2 days per week
Edy Santiago (Administrative Assistant), 3 days per week

Kyle Bucher, AECOM (MS4 Capital Projects Reviewer), 2 days per week
Marla Johnson, EA (MS4 GIS Database Manager), 2 days per week
Chelsea Connor, EA (MS4 GIS Technician), 2 days per week
Danielle Hankins, RKK (MS4 Program Scheduling / Capital Projects Manager), 2 day per week
Brittany Ayers, RKK (MS4 Post-construction Manager), 2 days per week

Kristianne Sandoval, RKK (MS4 Capital Projects Reviewer), on-call
Steve Stewart, Independent Contractor (MS4 Watershed Assessment Reviewer), on-call

B. Legal Authority

Harford County shall maintain adequate legal authority in accordance with NDPES regulations 40 CFR Part 122.26 throughout the term of this permit. In the event that any provisions of its legal authority is found to be invalid, the County shall notify MDE within 30 days and make the necessary changes to maintain adequate legal authority. All changes shall be included in the County's annual report.

Harford County Code Chapter 214 and Chapter 109 provide adequate legal authority for the implementation of this permit.

On November 8, 2019, MDE approved the County's request for a major permit modification to allow for nutrient trading. (Appendix B).

During this next reporting period, Harford County adopted one resolution related to the implementation of this permit (Appendix B).

Resolution 027-20 (12/15/2020) Financial Assurance Plan

This resolution approves the financial assurance plan required by the Annotated Code of Maryland ENV 4-202.I(j).

C. Source Identification

Sources of pollutants in stormwater runoff countywide shall be identified and linked to specific water quality impacts on a watershed basis. The source identification process shall be used to develop watershed restoration plans. The following information shall be submitted annually for all County watersheds within the permit area in geographic information system (GIS) format with associated table as required in PART V of this permit.

In May 2017, MDE distributed an updated *MS4 Geodatabase Design and User's Guide*. The updated documentation was the result of collaboration between MDE and the Phase I MS4 jurisdictions to address concerns from the jurisdictions. This geodatabase structure is very robust with multiple relational tables. Migration of existing data into this format will be labor intensive.

The County has begun to populate many of the feature classes and tables and is working towards developing an asset management program for the stormwater management facilities to accommodate MS4 reporting and management of triennial maintenance inspections.

In November 2020, MDE met with the MS4 jurisdictions to discuss proposed updates to the MS4 geodatabase. The proposed updates were based on questionnaires completed by the MS4 jurisdictions and to simplify MDE's process to export data for Chesapeake Bay modelling. The County anticipates forwarding additional comments to MDE in January 2021. When making updates to the database, MDE needs to consider the complexity of updating the existing data, particularly the BMP table and POI feature class, and ease of data entry for future information.

Because of the pending updates to the database, the County has delayed entering the BMP restoration into the MS4 geodatabase.

1. Stormdrain system: all infrastructures, major outfalls, inlets and associated drainage areas delineated;

Stormdrains

New stormdrains were installed associated with the 1.88 miles of roadway accepted by Harford County during this reporting period.

All stormdrain features, including point features (i.e. outfalls, manholes, inlets, etc.), stormdrain pipes, and stormdrain drainage areas were entered into the County geodatabase, Stormdrains.mdb.

The locations for the point features were input into the County geodatabase by georeferencing stormdrain design drawings. Associated attributes for the point features were also entered.

Point Features - 144
Outfalls (Closed Systems) – 14
Outfalls (Water Quality) - 10
Outfalls (Culvert) - 0
Inlets - 70
Inflows - 3
Manholes - 47

Using the point features, lines for the stormdrain pipe were added to the County geodatabase and the associated attributes were entered.

Drainage Areas

There were no major, non-industrial outfalls (36" or larger in diameter), however, there was one (1) industrial outfalls (12” or larger in diameter) for roads accepted during this reporting period.

A map of the outfalls and table of attributes are included in Appendix C1. The spatial and tabular data for the outfall locations (Outfall point feature class) was imported into the MDE geodatabase and submitted with this report.

2. Industrial and commercial sources: industrial and commercial land uses and sites that the County has determined have the potential to contribute significant pollutants;

The selection of the businesses to survey for potential impact to water quality is based on locations within commercial and/or industrial parks and parcels with an industrial or commercial land use as noted in the State tax assessment records. During this reporting period, the spatial and tabular data for all commercial and industrial businesses investigated was input into the County geodatabase, Hotspots.mdb. A map of the businesses and table of attributes are included in Appendix C2. A copy of the County geodatabase was submitted with this report. The MDE geodatabase contains no features classes or tables for hotspot investigations.

3. Urban best management practices (BMPs): stormwater management facility data including outfall locations and delineated drainage areas;

Stormwater Asset Management

During this reporting period, the County continued to update existing BMPs to align with MDE's geodatabase and accommodate the County's development of a stormwater management maintenance inspections application.

The features for BMP, POIs and POI drainage areas have been created for FY2009 through FY2020. The associated non-technical attributes for these features have also been completed. Engineer review and technical attributes have been completed for FY2014 through FY2020 (Appendix C3). The County had projected to complete with updating all of the BMPs updates by December 2020. The schedule was miscommunicated with EA Engineering who did not take into consideration the historic information. A complete review of the remaining historic BMPs will be submitted to MDE on February 1, 2021 along with an updated schedule for completion.

Stormwater Management Facilities

During this reporting period, 69 stormwater management projects were as-built for a total of 378 practices; practices were clustered by types of practices for a total of 207 unique MDE-identification number. The limits for each BMP were digitized into the County file geodatabase, HCBMP, by georeferencing stormwater design drawings. The associated attributes were also entered which will be used to create the BMP table in the MDE geodatabase.

Stormwater Management Drainage Areas

Points of interest and drainage areas for all facilities as-built during this reporting period were delineated and the associated attributes entered into the County file geodatabase, HCBMP.

A map of the stormwater locations and table of projects are included in Appendix C3. A copy of the County file geodatabase was submitted with this report.

Stormwater Management Waivers, Exemptions, and Fees in Lieu

During this reporting period, 16 projects were not required to provide stormwater management. The spatial and tabular data for all stormwater waivers, exemptions and fees in lieu is maintained in the County geodatabase, Stormwater.mdb.

Stormwater Management- 16
Waivers – 5
Exemptions – 11
Fees in Lieu – 0

A map of the waivers, exemptions and fees in lieu and table of attributes are included in Appendix C3. The totals for each were entered into the MDE geodatabase (SWM table) and submitted with this report.

4. Impervious surfaces: public and private land use delineated, controlled and uncontrolled impervious areas based on, at a minimum, Maryland's hierarchical eight-digit sub-basins;

During this reporting permit, the County contracted with KCI Technologies to merge the County's 2000 impervious surfaces layer with the sidewalk layer from 2007. The separation of

sidewalks for 2000 from the 2007 layer was previously discussed in the Impervious Surface Assessment Report, August 2016. Merging the two layers together has identified approximately 60 acres of overlapping areas, mostly where driveways from impervious 2000 layer now overlap the 2007 sidewalks layer. Additionally some of the assumptions from the August 2016 report incorrectly assigned the year 2000 to sidewalks, most in rural areas where there are no stormdrain systems. During the next reporting period, KCI will complete a full review of the merged impervious surfaces layer.

5. Monitoring locations: locations established for chemical, biological, and physical monitoring of watershed restoration efforts and the *2000 Maryland Stormwater Design Manual*; and

During this reporting period, there were 77 monitoring sites active including the 15 locations required as listed above. Four new precipitation gages were installed during this reporting period. The spatial and tabular data for all active and inactive monitoring sites is maintained in the County geodatabase, Monitoring.mdb.

Monitoring Sites - 77
Chemical - 14
Biological – 36
Flow - 13
Physical - 8
Rainfall – 6

A map of all active monitoring locations and table of attributes are included in Appendix C5. The spatial and tabular data for the 15 required monitoring locations (MonitoringSite point feature class) and associated drainage areas (MonitoringDrainageArea polygon feature class), were imported into the MDE geodatabase and submitted with the previous report.

6. Water quality improvement projects: projects proposed, under construction, and completed with associated drainage areas delineated.

During this reporting period, there were 22 watershed restoration projects active or completed.

The spatial and tabular data for all restoration projects is maintained in the County geodatabase, CIP.mdb.

Watershed Restoration Projects - 22

Completed - 6

Under Construction – 1

Under Design - 15

Maps of the completed and active watershed restoration project locations and table of attributes are included in Appendix C6. A copy of the County geodatabase was submitted with this report. The spatial and tabular data for all completed stream restoration projects were also entered into the MDE geobasebase (AltBMPLine line feature class and AltBMPLineInspctions table).

The Health Department did not respond to the MS4 Office's request for septic systems upgraded during this reporting period. The Health Department is likely overwhelmed with management of the Corona virus. The MS4 Office will report any upgraded systems within the next annual report.

Septic Upgrades using Best Available Technology (BAT) - 243

2020 – Not reported

2019 - 18

2018 - 18

2017 – 41

2016 – 69

2015 – 56

2014 - 41

During this reporting period, there were thirteen (13) septic systems abandoned and connected to the wastewater treatment plant. A map of the septic systems abandoned and connected to the wastewater treatment plant and table of attributes are included in Appendix C6. The spatial and tabular data was entered into the MDE geodatabase and submitted with this report (AltBMPPoint point feature class).

Septic Systems Abandoned & Connected to WWTP - 90

2020 – 13	2014 – 2
2019 - 6	2013 – 1
2018 – 9	2012 – 10
2017 – 8	2011 – 9
2016 – 9	2010 – 9
2015 – 3	2009 - 11

An inventory of the locations of septic systems pump outs was developed during this reporting period. Locations and volumes were taken from the manifests created for each truck that dropped off at Sod Run Wastewater Treatment Plant. The addresses were then used to match the location to the parcel data. A summary of the process to create this data is included in Appendix E2.a. During this reporting period, 4,516 septic systems were pumped out.

A map of the septic pumpouts and table of attributes are included in Appendix C6. The spatial and tabular data was entered into a database, SepticPumpOut, and submitted with this report.

D. Management Programs

The following management programs shall be implemented in areas served by Harford County's MS4. These management programs are designed to control stormwater discharges to the maximum extent practicable (MEP) and shall be maintained for the term of this permit. Additionally, these programs shall be integrated with other permit requirements to promote a comprehensive adaptive approach toward solving water quality problems. The County shall modify these programs according to needed program improvements identified as a result of periodic evaluations by MDE.

1. Stormwater Management

An acceptable stormwater management program shall continue to be maintained in accordance with the Environment Article, Title 4, Subtitle 2, Annotated Code of Maryland. Activities to be undertaken by the County shall include, but not be limited to:

a. Implementing the stormwater management design policies, principles, methods, and practices found in the latest version of the 2000 Maryland Stormwater Design Manual. This includes:

i. Complying with the Stormwater Management Act of 2007 (Act) by implementing environmental site design (ESD) to the MEP for new and redevelopment projects;

ii. Tracking the progress toward satisfying the requirements of the Act and identifying and reporting annually the problems and modifications necessary to implement ESD to the MEP; and

iii. Reporting annually the modifications that have been made or need to be made to all ordinances, regulations, and new development plan review and approval processes to comply with the requirements of the Act.

Under Bill 10-11, Harford County updated Chapter 214 in February 2010 to comply with the Stormwater Management Act of 2007.

During this reporting period, there were no modifications to Chapter 214.

> b. Maintaining programmatic and implementation information including, but not limited to:
>
> i. Number of Concept, Site Development, and Final plans received. Plans that are re-submitted as a result of a revision or in response to comments should not be considered as a separate project;
> ii. Number of redevelopment projects received;
> iii. Number of stormwater exemptions issued; and
> iv. Number and type of waivers received and issued, including those for quantity control, quality control, or both. Multiple requests for waivers may be received for a single project and each should be counted separately, whether part of the same project or plan. The total number of waivers requested and granted for qualitative and quantitative control shall be documented.
>
> Stormwater program data shall be recorded on MDE's annual report database and submitted as required in PART V of this permit.

For this reporting period, the following information was entered into the MDE geodatabase (SWM table) and submitted with this report.

<u>Stormwater Management Program</u>
Concept Plans Received - 39
Site Development Plans Received - 23
Final Plans Received - 32
Redevelopment Project Received - 3
Stormwater Exemptions Issued - 11
Stormwater Waivers Issued – 5

c. Maintaining construction inspection information according to COMAR 26.17.02 for all ESD treatment practices and structural stormwater management facilities including the number of inspections conducted and violation notices issued by Harford County.

For this reporting period, the following information was entered into the MDE geodatabase (SWM table) and submitted with this report.

Stormwater Management Construction
Construction Inspections -761
Construction Violations - 155

d. Conducting preventative maintenance inspections, according to COMAR26.17.02, of all ESD treatment systems and structural stormwater management facilities at least on a triennial basis. Documentation identifying the ESD systems and structural stormwater management facilities inspected, the number of maintenance inspections, follow-up inspections, the enforcement actions used to ensure compliance, the maintenance inspection schedules, and any other relevant information shall be submitted in the County's annual reports.

Four hundred fifty-five (455) stormwater facilities were inspected for triennial inspections during this reporting period. Thirty-two (32) of these facilities were not compliant at the end of this reporting period.

SWM Facilities Inspected for Preventative Maintenance (triennial) – 455
Compliant – 423
Non-Compliant – 32

Eighty-three (83) facilities were non-compliant through the end of the previous report period. One of these records was removed as a duplicate. Eight (8) of these facilities were compliant at the end of this reporting period.

SWM Facilities Inspected for Preventative Maintenance (carryover) - 82

Compliant – 8

Non-Compliant – 6

Under Repair – 6

Under Design for Retrofit - 3

Not Inspected - 59

During this reporting period, major repairs were completed for 2 facilities.

Major Stormwater Management Facility Repairs - 2

Amyclae Estates VI Pond 5

Woodsdale Road Commercial

A summary of preventative maintenance inspections is included in Appendix D1.

2. Erosion and Sediment Control

An acceptable erosion and sediment control program shall continue to be maintained and implemented in accordance with the Environment Article, Title 4, Subtitle 1, Annotated Code of Maryland. Activities to be undertaken by the County shall include, but not be limited to:

a. Implementing program improvements identified in any MDE evaluation of the County's erosion and sediment control enforcement authority;

On March 19, 2019, the County received program delegation through June 20, 2021 (Appendix D2).

b. Ensure that construction site operators have received training regarding erosion and sediment control compliance and hold a valid Responsible Personnel Certification as required by MDE;

Harford County conducts a pre-construction meeting prior to the issuance of grading permits.

Contractors are required to provide a copy of the valid Responsible Personnel Certification for the onsite field supervisor.

> c. Program activity shall be recorded on MDE's annual report database and submitted as required in PART V of this permit; and

For this reporting period, the following information was entered into the MDE geodatabase (ErosionSedimentControl table) and submitted with this report.

Erosion and Sediment Control Program
Active Permits - 155
Disturbed Area – 2,001 acres
Number of Inspections – 3,231
Number of Violations – 934
Number of Stop Work Orders - 27

> d. Reporting quarterly, information regarding earth disturbances exceeding one acre or more. Quarters shall be based on calendar year and submittals shall be made within 30 days following each quarter. The information submitted shall cover permitting activity for the preceding three months.

Forty-three (43) of the 54 grading permits issued during this reporting period exceeded one acre of earth disturbance. Quarterly reports were submitted as required. The spatial and tabular data for grading permits one acre or more is maintained in the County geodatabase, Grading.mdb.

A map of the grading permit locations and table of attributes are included in Appendix D2. The spatial and tabular data for the grading permit location (QuarterlyGradingPermits point feature class) and attributes (QuarterlyGradingPmtInfo table) were imported into the MDE geodatabase and submitted with this report.

3. Illicit Discharge Detection and Elimination

Harford County shall continue to implement an inspection and enforcement program to ensure that all discharges to and from the MS4 that are not composed entirely of stormwater are either permitted by MDE or eliminated. Activities shall include, but not be limited to:

a. Field screening at least 100 outfalls annually. Each outfall having a discharge shall be sampled using a chemical test kit. Within one year of permit issuance, an alternative program may be submitted for MDE approval that methodically identifies, investigates, and eliminates illegal connections to the County's storm drain system;

Outfall Screening Program

During this reporting period, Harford County utilized its contractor, Versar, Inc. to conduct outfall screenings. The outfalls were selected and screened following the protocols outlined in the *Harford County Illicit Discharge Monitoring Program: Site Selection, Screening and Quality Assurance Protocols (Versar, Inc. 2010).* Additional outfalls were screened by Harford County Inspectors, using an outfall screening app described in the FY2018 Annual Report.

Outfall Screening Activities

During this reporting period, a total of 185 outfalls were screened. Versar, Inc. performed 122 outfall screenings. County inspectors screened an additional 63 outfalls. One outfall was inspected twice for a total of 186 inspections. Twenty-four outfalls exhibited dry weather flow. Versar, Inc. tested and re-tested dry-weather flow at the 24 outfalls and performed source tracking according to protocol.

Using the criteria established in the *Harford County Illicit Discharge Monitoring Program: Site Selection, Screening, and Quality Assurance Protocols (Versar, Inc. 2010)*, one outfall had a high likelihood of illicit discharge. One outfall had a moderate likelihood of illicit connection. Nine outfalls had a low likelihood of illicit discharge. The remaining flowing outfalls tested did not exceed the action criteria for any parameter. A table summarizing the outfall screenings in

which an action criteria was exceeded and the likely source or outcome is provided in Appendix D3.

One outfall (OF002838) with a high likelihood for illicit discharge exceeded the action criteria for conductivity, chlorine and surfactants. This outfall resulted in a Hotspot investigation at Wawa on Hoagie Drive in Bel Air and is described in the Hotspot Investigation Program section of this report. As a result of the Hotspot Investigation, this illicit discharge has been eliminated.

One outfall (OF00424) had a moderate likelihood for illicit discharge and exceeded the action criteria for chlorine. Follow-up is required but was not completed during this reporting period.

Nine outfalls had a low likelihood for illicit discharge. All nine exceeded the action criteria for color. The sources at three outfalls were determined to be sediment, rust or seepage. No source could be determined at six of the outfalls.

Harford County Illicit Discharge Inspection Program, Monitoring Period July 2019 - June 2020, Versar, Inc. (2020) describing the outfall screening protocol and findings is provided in Appendix D3.

A map of the inspected outfalls and table of attributes are included in Appendix D3. The tabular data (IDDE table) were input into the MDE geodatabase and submitted with this report.

Outfall Inspections – 186
No Flow – 162
Dry Weather Flow – 24
Illicit Discharges under Investigation – 1
Illicit Discharges Eliminated - 1

b. Conducting annual visual surveys of commercial and industrial areas as identified in PART IV.C.2 above for discovering, documenting, and eliminating pollutant sources. Areas surveyed shall be reported annually;

Hotspot Investigation Program

Windshield Surveys

Windshield surveys are performed at commercial and industrial properties by Versar Inc. Versar, Inc. and MS4 staff jointly select locations within business parks, industrial parks, or properties identified within the tax records as commercial or industrial. Surveys are completed using datasheets from the *Center for Watershed Protection's Unified Subwatershed and Site Reconnaissance: A User's Manual (2005)*. Hotspots are characterized as "severe hotspot", meaning actively polluting, "confirmed hotspot", meaning the site has a high potential for polluting", "potential hotspot", meaning the site has a moderate potential for polluting and "not a hotspot".

Locations with active pollution discharges (severe hotspots) are reported immediately to MS4 staff or Harford County HAZMAT depending on the severity of the discharge. Discharges reported to Harford County HAZMAT are investigated immediately. Non-emergency discharges are investigated by MS4 staff within the same business day.

Confirmed hotspots, without active pollution discharge, are reported to MS4 staff monthly.

Reported Hotspots

Reported hotspots are identified by citizens or County employees who report an issue via telephone, email or Facebook. Reported hotspots determined as an emergency are forwarded to Harford County HAZMAT. All other reported hotspots are investigated by MS4 staff.

Confirmed Hotspots

MS4 staff visits confirmed hotspots and reported hotspots to verify the site as a hotspot.

Confirmed hotspots with active NPDES industrial permits or confirmed hotspots with activities that may require an NPDES industrial permit are forwarded to the MDE Compliance Hotline (866) MDE-GOTO. Confirmed hotspots that discharge into another jurisdiction's MS4 system are forwarded to that jurisdiction (MD State Highway, City of Aberdeen, Town of Bel Air, City of Havre de Grace).

For each confirmed hotspot not referred to another jurisdiction, a case is opened, and the property owner is contacted by mail. The letter documents the issues and lists the

recommended remediation to be completed within a designated timeframe, typically 30 days. Follow-up with the property owner continues until the remediation is completed, and the case is closed.

Potential Hotspots

During Versar's windshield survey, a portion of the sites are classified as Potential Hotspots. Based on MDE's comments of the County's 2018 Annual Report, the County initiated an education program aimed at these businesses. During this reporting year, the County developed educational Fact Sheets detailing good housekeeping practices for various types of business activities. Fact Sheets developed by Harford County are provided in Appendix D3.

Hotspot Geodatabase

Harford County developed a geodatabase to more efficiently track the status of hotspot investigations. The location, date and category for all hotspot investigations are entered into the County geodatabase, Hotspot.mdb. For confirmed hotspots, a case file is opened, and a record is added to a case file for each date and action taken, such as letter to owner, email from owner, or site visit. The County geodatabase allows for the visual assessment of the locations of hotspot investigations and easily documents open cases for follow-up.

Hotspot Investigation Activities

During this reporting period, windshield surveys were conducted at 53 sites, and three new confirmed hotspot cases were opened. Two of these three hotspots were closed. At the end of the last reporting period, seven cases were still open. During this reporting period, six of these cases were closed. One case was referred to MDE for enforcement. This case remains open.

There were no reported hotspots during this reporting period. One confirmed hotspot was located as a result of outfall screening. This hotspot was closed during this reporting period.

The County mailed appropriate guidelines for good housekeeping measures to twenty-five "potential hotspot" businesses that were identified during the previous reporting period. These cases were then closed. "Potential hotspot" businesses identified during this reporting period will receive educational materials during the next reporting period.

The Hotspot Activity Report for this reporting period is provided in Appendix D3.

Harford County Illicit Discharge Inspection Program, Monitoring Period July 2019 - June 2020, Versar, Inc. (2020) describing windshield survey protocol and findings is provided in Appendix D3.

The MDE geodatabase contains no features classes or tables for hotspot investigations.

Windshield Surveys Performed – 53
Confirmed Hotspots Identified - 4
Confirmed Hotspots Carryover - 7
Confirmed Hotspots Closed – 8
Confirmed Hotspots Referred to MDE – 1
Confirmed Hotspots Remaining Open – 2
Potential Hotspots Identified – 34
Potential Hotspots Closed - 25

c. Maintaining a program to address and, if necessary, respond to illegal discharges, dumping, and spills;

MS4 staff continues to implement and improve initiatives to address illegal discharges, dumping and spills through coordination with Harford County Emergency Services, Harford County Division of Water and Sewer, Harford County Division of Environmental Services and Harford County Health Department.

Illegal Discharges, Dumping and Spills Program

Reporting

The public has several avenues by which to report these activities. The numbers listed below are published in water and sewer bills, the Harford County website and public outreach literature.

Emergency Services (911) and Non-Emergency (410.638.3400)

Both phone numbers are monitored 24 hours a day and answered by trained public safety dispatchers. For spill response throughout the county including the municipalities, the HAZMAT Team responds to each incident.

Office of Watershed Protection and Restoration (410.638.3217)
All reports of illegal discharges, dumping and spills are transferred to the appropriate phone number listed above based on the level of imminent emergency.

You Click, We Fix
(http://www.harfordcountymd.gov/1737/You-Click-We-Fix)
Harford County provides a web form for citizens to report issues. Harford County Department of Governmental and Community Relations reviews the submissions and directs the request to the appropriate agency.

Emergency Services

The HAZMAT Team operates 24 hours a day and consists of 31 certified Hazardous Materials technicians and 5 primary response vehicles. Training occurs continuously throughout the year. The HAZMAT Team responds to each call directed from the public safety dispatcher. Every attempt is made to recover spill materials before the spill reaches a stormdrain or waterway unless weather or terrain prohibits the recovery. All spills that reach a stormdrain or waterway are reported to Maryland Department of the Environment, Emergency Response. All spills that reach a navigable waterway are reported to the National Response Center. A HAZMAT Incident report is created for each response and contains a summary of the actions taken.

Local Emergency Planning Committee (LEPC)

The Local Emergency Planning Committee (LEPC) meets bi-monthly. One of several topics on the agenda includes the review of incidents of illegal discharges, spills and dumping to determine if enforcement action is warranted. The LEPC also conducts the investigative hearings and assesses fines as appropriate. During this reporting period, the LEPC met four times. Meeting agendas are provided in Appendix D3.

Division of Water and Sewer

The Harford County Health Department assists the Division of Water and Sewer with sanitary sewer overflows (SSOs). They determine appropriate forms of public notification, identifying downstream users, directing stream testing and assessing adequacy of site cleanup.

Health Department

The Health Department responds to citizen reports of leaking or overflowing septic systems and private sewer lines. Most of these calls are placed directly to the Health Department offices. A portion of citizen reports are routed from Emergency Operations. MS4 staff continues to work with the Bureau of Environmental Health to coordinate preventive and clean-up protocols regarding discharges (oil, grease, leaky dumpsters) from restaurants that impact the stormdrain system.

Illegal Discharges, Dumping and Spills Activities

The following is a summary of Harford County's HAZMAT team responses, investigations and enforcement activities related to illegal discharges, dumping and spills that occurred during this reporting period. Beginning in January 2016, the HAZMAT team added a field to their records indicating if the pollutant entered a waterway.

HAZMAT Team Responses
Total responses – 133
Potential water quality impact responses – 57
Incidents where pollutants reached a waterway– 6
Number of Notices of Violation – 2
Fines Assessed - $1,100

LEPC Meetings
September 18, 2019
November 20, 2019
January 15, 2020
May 20, 2020

Detailed information for HAZMAT responses is included in Appendix D3.

> d. Using appropriate enforcement procedures for investigating and eliminating illicit discharges, illegal dumping, and spills. Significant discharges shall be reported to MDE for enforcement and/or permitting; and

> e. Reporting illicit discharge detection and elimination activities as specified in PART V of this permit.

For this reporting period, activities for outfall screenings, hotspot investigations and spill response are listed above.

> 4. Litter and Floatables
>
> This section of the permit requires Harford County to address problems associated with litter and floatables in waterways that adversely affect water quality. Increases in litter discharges to receiving waters have become a growing concern both nationally and within Maryland and cannot be ignored. Harford County needs to evaluate current litter control problems associated with discharges from its storm drain system and develop and implement a public outreach and education program as needed on a watershed by watershed basis.

The Division of Environmental Services implements the County's environmental, solid waste management and recycling programs. This includes managing the following operations: the Harford Waste Disposal Center, including landfill, homeowner drop-off, Mulch & Compost Facility and Recycling Transfer Station, the Roadside Litter Control Program, the Used Oil & Anti-freeze Program and Noxious Weed Control Program. A detailed list is included in Appendix D4.

The Division of Environmental Services prepared a comprehensive update to the Solid Waste Management Plan for the 2015 – 2024 planning period. The new Plan was introduced by the County Council under Bill No. 15-004. A public hearing was held on February 17, 2015, and the Council approved the Plan as amended on March 3, 2015. In May 2015, MDE's Land Management Administration completed a review of the Plan and determined that the adopted Plan satisfied the requirements of Section 9-503(a) of the Environment Article and Code of Maryland Regulation 26.03.03. In accordance with Section 9-507(a) of the Environmental Article, Annotated Code of Maryland, and the Plan was approved.

a. As part of Harford County's watershed assessments under PART IV.E.1 of this permit, Harford County shall document all litter control programs and identify potential sources, ways of elimination, and opportunities for overall improvement.

The Litter Control Program consists of staff picking up blown litter at the Harford Waste Disposal Center and along County roadways, as well as cleaning up of illegal dumpsites throughout the County. Staff is also assisted by Community Service workers and citizens participating in the Absent Parent Program. During this reporting period, the Litter Control Program reported the following:

Litter Control Program
Trash Collected – 51,963 lbs.
Recyclables Collected – 14,780 lbs.
Roads Cleaned – 724 miles

The County has a very successful Adopt-A-Road program, whereby County residents or groups of residents adopt a portion of a roadway in their community and agree to collect roadside litter at a specified frequency. The County provides supplies, materials and removal of roadside litter collected for these residents. During this reporting period, the Adopt-A-Road Program reported the following:

Adopt-A-Road Program
Trash Collected – 5,129 lbs.
Recyclables Collected – 1,579 lbs.
Roads Cleaned – 106 miles
Adopt-A Road Signed Contracts – 105

Both groups combined collected 258 tires.

b. Within one year of permit issuance, as part of the public education program described in PART IV.D.6., Harford County shall develop and implement a public education and outreach program to reduce littering and increase recycling. This shall include:

i. Educating the public on the importance of reducing, reusing, and recycling;
ii. Disseminating information by using signs, articles, and other media outlets; and
iii. Promoting educational programs in schools, businesses, community associations, etc.

Harford County's Office of Recycling currently administers a public education and outreach program to reduce littering and increase recycling through media outlets, school, community, business, parks and recreation, computer and electronic, and household waste programs.

During this reporting period, the Office of Recycling reported the following:

Public Education and Outreach
Recycling Education and Outreach to County Residents – 8 events, 1,800 participants
Tours of the Harford Waste Disposal Center – 9 tours, 140 participants
School Presentations – 5 presentations, 800 participants
Public Outreach Events – 13 events, 1,215 participants
Social Media Postings - 974

Published 4 advertisements in local papers, magazines, mailings, and website.

c. Evaluating annually the effectiveness of the education program.

d. Submit annually, a report which details progress toward implementing the public education and outreach program. The report shall describe the status of public outreach efforts including resources (e.g., personnel and financial) expended and the effectiveness of all program components.

The success of the recycling education and outreach program is measured by the compilation and the submittal of two annual reports to the MDE. These include the Maryland Recycling Act Report and the County Source Reduction (SR) Credit Report.

Although Harford County has been a leader in its recycling rates, significant amounts of recyclables are observed daily within the solid waste loads disposed of at the landfill. The County devotes significant resources in its annual budget to public outreach and education programs. It is believed that, no matter how many resources are utilized in public outreach and education, at some point a plateau is reached in its effectiveness. No matter how much effort is put into this endeavor, there will always be residents who refuse to participate in recycling. Funding, education, and outreach alone cannot change an individual's particular behavior.

5. Property Management and Maintenance

a. Harford County shall ensure that a Notice of Intent (NOI) has been submitted to MDE and a pollution prevention plan developed for each County-owned municipal facility requiring NPDES stormwater general permit coverage. The status of pollution prevention plan development and implementation for each County-owned municipal facility shall be reviewed, documented, and submitted to MDE annually.

Notice of Intent (NOI) for County Owned Property

NOIs and pollution prevention plans for all County owned properties requiring coverage under the general stormwater permit (12SW) have been submitted and approved.

County Owned Property 12SW General Permit

Abingdon Highway Maintenance Facility – 12SW1271
Fallston Parks and Recreation Maintenance Facility – 12SW2095
Hickory II Highway Maintenance Facility – 12SW1714
Jarrettsville Highway Maintenance Facility – 12SW2474
Jarrettsville Parks and Recreation Maintenance Facility – 12SW2094
Public Schools Maintenance Facility – 12SW2084
Harford Waste Disposal Center – 12SW0028
Sod Run Waste Water Treatment Plant – 12SW1727
Whiteford Highway Maintenance Facility – 12SW1847

Annually, MS4 staff sends notices to facilities 12SW permits to review the individual SWPPPs and to provide any necessary updates. Each facility is required to perform all necessary inspections and trainings and to keep the records on site. The Sod Run Waste Water Treatment Plant, Harford County Board of Education and the Scarboro Landfill, operated by Maryland Environmental Services, conduct their own inspections, as required by their 12SW permits.

As requested by Highways and Parks & Recreation, the MS4 Office assists in conducting annual inspections of those facilities. During this reporting period, the MS4 office assisted in completing annual inspections for six facilities (Appendix D5). The MS4 Office along with each facility manager inspected the site and reviewed the pollution prevention plan for completeness. Minor housekeeping improvements were noted and implemented.

Annual Pollution Prevention Inspections conducted by the MS4 Office

Abingdon Highway Maintenance Facility – 12SW1271
Hickory II Highway Maintenance Facility – 12SW1714
Jarrettsville Highway Maintenance Facility – 12SW2474
Whiteford Highway Maintenance Facility – 12SW1847
Fallston Parks and Recreation Maintenance Facility – 12SW2095
Jarrettsville Parks and Recreation Maintenance Facility – 12SW2094

During this reporting period, MDE conducted 12SW compliance inspections at all four Highway Maintenance Facilities and both Parks and Recreation facilities. All but the Jarrettsville Parks and Recreation Maintenance Facility were found to be in compliance. The Jarrettsville Parks and Recreation Facility was in non-compliance due to record keeping. Harford County has corrected this deficiency. It should be noted that the MDE compliance inspector indicated that this site may be eligible for a No Exposure Certification. Harford County will submit a No Exposure Certification request to MDE during the next reporting period.

A map of the County owned properties with 12SW permits and table of attributes are included in Appendix D5. The spatial and tabular data (MunicipalFacilities point feature class) were input into the MDE geodatabase and submitted with this report.

b. The County shall continue to implement a program to reduce pollutants associated with maintenance activities at County-owned facilities including parks, roadways, and parking lots. The maintenance program shall include these or MDE approved alternative activities:

i. Street sweeping;
ii. Inlet inspection and cleaning;
iii. Reducing the use of pesticides, herbicides, fertilizers, and other pollutants associated with vegetation management through increased use of integrated pest management;
iv. Reducing the use of winter weather deicing materials through research, continual testing and improvement of materials, equipment calibration, employee training, and effective decision-making; and
v. Ensuring that all County staff receives adequate training in pollution prevention and good housekeeping practices.

The County shall report annually on the changes in any maintenance practices and the overall pollutant reductions resulting from the maintenance program. Within one year of permit issuance, an alternative maintenance program may be submitted for MDE approval indicating the activities to be undertaken and associated pollutant reductions.

During this reporting period, Harford County Highways Division continued its road maintenance operations to ensure public safety in a cost-efficient manner.

Harford County Highways Division uses a tracking system to maximize the efficiency of equipment usage. The *PreCise ® Mobile Resource Management* is designed to track the location of all vehicles to maximize equipment uptime, redeploy equipment where it will be more effective, track salt usage and adhere more easily to environmental policies. The system produces reports for vehicle travel patterns, down time, break-downs and travel speed.

Street Sweeping

Harford County maintains 1,075.30 miles of roadway. Approximately 85% of all public streets were swept with a mechanical brush vacuum truck. Additionally, certain major collector roads may be swept monthly. During this reporting period, 1,856 lane miles of hard surface roads were swept. The street sweeping practice collected 2037 tons of material. Material collected during street sweeping is disposed of in the local landfill or maintenance yard. Dirt roads are not swept.

Street Sweeping
1,856 lane miles
2037 tons

Inlet Inspection and Cleaning

Inlets are scheduled to be inspected and cleaned at a minimum of every three years. Inlets may be cleaned more frequently if needed. There are approximately 12,000 inlets throughout Harford County. Inlets are assigned to each of the four Highways Districts, according to snow routes. All inlets along a specified snow route are inspected and the snow routes are rotated over a three-year period. Inlets may be cleaned with vacuum sweepers, backhoes, or manually. During this reporting period, 5,350 inlets were inspected and were cleaned as needed resulting in 138 tons of material removed from the stormdrain system.

Inlet Inspections and Cleaning
5,350 inlets
138 tons

Vegetation Management

Mowing and trimming are the primary means of managing roadside vegetation. During this reporting period, Harford County Highways Division mowed 1,749 road miles, trimmed 619,863 feet of guardrail, and trimmed around 26,998 road signs. Additionally, the County employs contractors to mow medians, mow County-owned stormwater management ponds, trim around guardrails and remove trees. County-owned parks and recreation complexes are maintained by mowing and trimming.

The County ensures pesticides and fertilizers are applied appropriately by requiring all contractors who perform such work to be licensed by Maryland Department of Agriculture in aquatic weed control, right-of-way weed control and to have a Professional Pesticide Application License. The County does not track herbicide and fertilizer use by contractors, as the contractors must report this information to Maryland Department of Agriculture annually.

County-owned stormwater wet ponds are treated with Aquashade as needed for algae control. The County also applies weed control at Recreation & Parks facilities if needed. Noxious weeds are treated with herbicides at various County-owned property as needed. Chemical application data for County-applied algaecides and herbicides (ChemicalApplication table) was input into the MDE geodatabase and submitted with this report. Reporting logs are included in Appendix D5.

Harford County Environmental Services Division is responsible for administering the Noxious Weed Control in accordance with Maryland Department of Agriculture's requirements for complying with the Maryland Weed Control Law. Herbicide application for noxious weed control is provided in Appendix D5. MES-applied herbicide applications within Harford County are also included in the MDE geodatabase.

Deicing

All dump trucks are calibrated to deliver 300 pounds of salt per lane mile. County staff evaluates road conditions for each storm to determine the most effective treatment for the conditions of the particular storm and for the area of the County affected. Salt brine trucks are calibrated to deliver about 40 gallons per lane mile. This 40 gallons of brine uses about 70 lbs of salt, which is less than ¼ of salt used via traditional application. During this reporting period, 9,658 gallons of brine were applied to road surfaces. Salt usage for the winter of 2019 – 2020 was 2,570 tons. Salt usage (ChemicalApplication table) was input to the MDE geodatabase and submitted with this report.

Deicing Application

Brine – 9,658 gallons

Salt – 2,570 tons

Employee Training

Harford County Highways Division and the Department of Parks and Recreation conduct monthly safety training for its staff. At a minimum, the topics of spill response and reporting and good housekeeping practices are covered annually. Training topics also include snow removal, equipment inspection, and material safety data sheets (MSDS). Equipment operators are trained and tested annually. Harford County Public Schools, the Sod Run Wastewater Treatment Plant and Scarboro Landfill also train employees in good housekeeping practices. Trainings per group are provided in Appendix D5.

Employee Training

Number of employees receiving training: 853

6. Public Education

Harford County shall continue to implement a public education and outreach program to reduce stormwater pollutants. Outreach efforts may be integrated with other aspects of the County's activities. These efforts are to be documented and summarized in each annual report. The County shall continue to implement a public outreach and education campaign with specific performance goals and deadlines to:

a. Maintain a compliance hotline or similar mechanism for public reporting of water quality complaints, including suspected illicit discharges, illegal dumping, and spills.

Reporting mechanisms are described in Section D. 3. c.

b. Provide information to inform the general public about the benefits of:

i. Increasing water conservation;
ii. Residential and community stormwater management implementation and facility maintenance;
iii. Proper erosion and sediment control practices;
iv. Increasing proper disposal of household hazardous waste;
v. Improving lawn care and landscape management (e.g., the proper use of herbicides, pesticides, and fertilizers, ice control and snow removal, cash for clippers, etc.);
vi. Residential car care and washing; and
vii. Proper pet waste management.

Public Outreach Events

Harford County continues to engage and educate the public as described below. A summary of these events, including number of participants reached and hours spent is included in Appendix D6.

MS4 staff continued the annual "Harford Streams Summer Adventure" program which runs from Memorial Day through Labor Day and the annual "Poker Run" event held on July 20, 2019. The Summer Adventure Program and Poker Run's intent is to encourage the community to explore the County's local waterways, to understand their importance as part of the Bay's ecosystem, and to promote awareness and support to protect them. Public participation has increased each year and feedback from participants continues to be positive.

In July 2019, MS4 staff partnered with the Harford County Master Gardeners (MG), Master Watershed Stewards, Bel Air Home Depot, and Bell Nursery to encourage the public to plant gardens with a purpose. The goal is to educate the public about the importance of planting perennials and shrubs native to Maryland, to emphasize why natives are the better plant option for the landscape, biodiversity, water quality, wildlife, and pollinators, and to make native plants more accessible to our citizens. The MS4 staff developed informational native plant tags palm cards, and a native plant sign to help customers easily identify the native plants. The tags were placed in front of the native plants and the palm cards were distributed by Master Gardeners and Master Watershed Stewards at the Home Depot garden center at three events during the spring and summer planting seasons. The Master Gardeners were available to help the public with proper plant selection, answer questions and increase awareness about the positive effects of native plants in an effort to promote behavior change.

In July 2019, MS4 staff along with Chesapeake Bay Trust staff hosted a grant workshop at the McFaul activities Center to inform the public about the opportunities available in the Outreach and Restoration Grant Program. The grant program is made available in partnership with Harford County Government to fund projects that both improve communities and local natural resources. The workshop focused on how to apply and receive funding to design and implement education, outreach, and restoration projects to help protect Harford County's natural resources and improve your community. Participants were encouraged to bring project ideas to discuss and staff was available to answer questions and offer resources.

In August 2019, MS4 staff conducted a Pet Waste Poll at PETCO in Bel Air. The goal of the poll was to gather information from citizens on their pet waste removal and disposal practices and

to educate citizens on the water quality impacts of pet waste on local streams. MS4 staff created and distributed a handout that summarized the negative effects of pet waste on water quality, emphasized pet waste is an environmental pollutant, and provided solutions for proper waste disposal.

In August 2019, the Maryland Department of the Environment (MDE) held a public hearing concerning the tentative determination to modify Harford County's MS4 permit at the Harford County Council Chambers. In November 2019, MDE reached a final determination to modify the permit.

In November 2019, MS4 staff participated in the Eden Mill Nature Center (EMNC) annual Fall Fest, a family event appropriate for all ages. During this event, staff set up an informational display that promoted the importance of healthy streams and watersheds. Topics addressed included explaining the impacts of impervious surfaces, stormwater and nonpoint source pollution on water quality, the need for proper erosion and sediment control measures, the benefits of recycling, native plants, proper lawn care, and rain gardens as well as the importance of properly disposing of hazardous household materials and pet waste. All participants received a passport scavenger hunt card that encouraged them to engage with other exhibitors whose goals were to promote environmental and cultural awareness. Exhibitors included the Phoenix Wildlife Center, the Natural History Society of Maryland, Harford Land Trust, and Master Gardeners. This event reached 900 people this year.

In June 2020, MS4 staff virtually participated in the Upper Western Shore Wade-In organized by the staff at the Anita C. Leight Estuary Center and volunteers of the Otter Point Creek Alliance. MS4 staff created a short video highlighting the mission and goals of the Watershed Protection and Restoration Office and the importance of healthy streams and watersheds. The video was shared on social media the day of the event.

School Activities

In March 2020, MS4 staff participated in a career fair at Edgewood Elementary School. This was an interactive event with students in grades PreK through 5 highlighting various duties and responsibilities of MS4 biologists and engineers. Field and lab equipment, aquatic insects, restoration design plans, project photos and safety gear were on display to educate and discuss with students how each is used in the respective career. The Willoughby Beach Stream Restoration Project is located at Edgewood Elementary; the staff utilized this project to create a more immersive and tangible reference for the students.

During this reporting period, MS4 staff assisted the students in the Environmental Club at Forest Hill Elementary School (FHES) in conducting a tree inventory on the school campus. The goal of the project was to replicate a tree inventory that was completed prior to the construction of the current school building in 2000. The students used the data results from the previous inventory, and compared historical and current aerial photographs to determine the number of trees that were removed during the construction of the new school and which trees were not removed. After the preliminary desktop analysis, the students walked the campus and located the trees that remained. Students documented tree locations, species type, size, general health and if the tree was native or non-native to Maryland.

Miscellaneous Outreach

Harford Streams Facebook

In July 2015, MS4 staff began utilizing Harford Streams – Green Choices. Healthy Streams. Facebook Page to inform, engage and encourage support for protecting local waterways. During this reporting period, Watershed Protection and Restoration staff reported the following:

Facebook Insights
Total Page Likes – 1,515
Total Reach – 129,709
Total Impressions – 170,571

Anita C. Leight Estuary Center

The Anita C. Leight Estuary Center (ACLEC) is a Harford County Department of Parks and Recreation facility and is a component of the Chesapeake Bay National Estuarine Research Reserve (CBNERR). Otter Point Creek Alliance (OPCA) is the non-profit organization of the ACLEC dedicated to supporting the ACLEC's and CBNERR's mission to increase the awareness, understanding, and appreciation of estuarine ecosystems through research, monitoring, and education. During this reporting period, MS4 staff continued to serve on the board of directors for the Anita C. Leight Center's Otter Point Creek Alliance but did not participate in as many in person outreach events due to Covid-19.

During this reporting period, the ACLEC staff and volunteers were able to host various outreach events either in person or virtually. Various events occurred as scheduled before the pandemic;

however, many events scheduled after March were modified or cancelled. Events that proceeded included a virtual Earth Day, World Wetlands Day, virtual Harford County Wade-In, school programs, summer camps, canoe and kayak trips, and Envirothon. The information below summarizes the number of people reached during each of the educational opportunities.

Number of People Reached (3,678)
General Public – 3,497
Elementary, Middle and High School Students – 160
Organized Groups – 21

ACLEC volunteers contributed numerous hours towards stewardship projects that included the removal of invasive plants, growing and planting bay grasses, plankton monitoring, planting native plants in the Critical Areas and bioretention facilities, and juvenile fish sampling.

Eden Mill Nature Center

The Eden Mill Nature Center (EMNC) is a Harford County Department of Parks and Recreation facility located in the Piedmont Plateau along the mainstem of Deer Creek. EMNC provides a variety of resources to encourage environmental education and outdoor recreation for people of all ages and is dedicated to developing a greater awareness and appreciation to the natural and historical resources of the area.

EMNC staff provides public education and outreach through various nature center activities, camps, programs, special events and meetings.

During this reporting period, the Eden Mill Nature Center reported the following:

Number of People Reached (3,736)
Registered Participants – 2,917
Drop in Visitors – 819

EMNC had 818 volunteers that contributed 3,977 hours to support the nature center activities, special events and meetings.

Master Gardeners

During this reporting period, MS4 staff developed a more significant, mutually beneficial partnership with the Harford County Master Gardeners. The MG volunteers provide a desirable level of expertise on Maryland native plants, pollinators, garden design, and knowledge on engaging and interacting with the public. MS4 staff utilized the MG expertise to launch the Plant with a Purpose Program and assist with the design and native plant selection for the newly constructed bioretention facility in the Mary Risteau Courthouse parking lot. The County anticipates capitalizing on this partnership to enhance the MS4 programs ability to network with County residents and property owners.

Master Watershed Stewards (MWS)

Master Watershed Stewards work within their communities to identify pollutants, educate their neighbors about stream health, and take actions to reduce human impacts on water quality.

During this reporting period, eight Harford County MWS and nine steward candidates completed various projects, participated in numerous outreach functions and continuous education classes and workshops. The 9 steward candidates will graduate in the next reporting period.

<u>Master Watershed Stewards</u>
Activities Performed –67
MWS Volunteer Hours – 645
Individuals Educated – 204

Office of Drug Control Policy

The Harford County Office of Drug Control Policy (HCODCP) in conjunction with the Harford County Sheriff's Department, Maryland State Police, Havre de Grace Police Department and the U.S. Drug Enforcement Administration hosted a Prescription Drug Take Back event and collected unwanted medications from seven permanent drop-off boxes. This event and drop-off locations allow the safe collection of unused or expired medications so that they may be disposed of safely and without harm to the environment. Periodically, the medications are delivered to an incinerator for proper disposal.

During this reporting period, the HCODCP reported the following:

Total Unwanted Medications Collected – (2,037 lbs.)
Aberdeen Police Department – 317 lbs.
Havre de Grace Police Department – 472 lbs.
Maryland State Police – 248 lbs.
Harford County Administration Building – 602 lbs.
Wegmans – 398 lbs.

Outreach Partners and Master Watershed Stewards

The MS4 staff continues to grow our outreach partnerships with other Harford County departments and several environmental groups. The partners meet bi-monthly to discuss the development and implementation of outreach programs that will educate the public to reduce the discharge of pollutants caused by stormwater runoff to comply with the County's MS4 Permit. Partners include Planning and Zoning, Anita C. Leight Estuary Center, the City of Havre de Grace, Eden Mill Nature Center, Visit Harford, Mariner Point Park, Gunpowder Riverkeeper, University of Maryland Sea Grant Extension, Harford Soil Conservation District, Churchville Recreation Center, Maryland Environmental Service and Master Watershed Stewards.

The University of Maryland Sea Grant Extension and MS4 staff continues meeting bi-monthly with the Master Watershed Stewards and steward candidates to provide updates, discuss project opportunities, to provide technical resources for questions that are beyond the steward's scope and/or expertise, and to ensure they are meeting their annual volunteer and continuing education requirements.

During this reporting period, MS4 staff continued creating a monthly bulletin to inform and engage our outreach partners and our Master Watershed Stewards. The bulletin provides information and possible opportunities for service hours through BMP projects, learning opportunities through webinars, events, and field trips, as well as other items of interest and funding opportunities.

Watershed Stewards Academy Partners

In December 2018, MS4 staff began attending quarterly WSA partners meetings. The University of Maryland Sea Grant Extension staff provided a forum so all the academies could learn from each other and to provide an opportunity to discuss a state-wide conference for the stewards.

The meetings provide an opportunity to share on each academy's status, challenges faced, support needed, and ideas.

In July 2019, MS4 staff was invited to speak at the Harford Leadership Academy Alumni Association Meeting held at Harford Community College. Staff gave an overview of the MS4 program and the Watershed Stewards Academy. They explained how our projects help mitigate storm water and improve water quality, and how the average citizen might help improve water quality by becoming a Master Watershed Steward.

In August 2019, MS4 staff organized a tour of the Bear Cabin stream restoration project in Forest Hill to showcase the finished product to people that support many of our projects. The tour was led by Ecotone who designed and constructed the project.

In January 2020, MS4 staff held a community meeting with the residents in the Sunnyview watershed to discuss questions and concerns about the stream restoration project. Staff explained the purpose, goals and objectives of the project and how these restoration efforts assist the County in meeting water quality and watershed improvement goals.

c. Provide information regarding the following water quality issues to the regulated community when requested:

i. NPDES permitting requirements;
ii. Pollution prevention plan development;
iii. Proper housekeeping; and
iv. Spill prevention and response.

The regulated community consists of businesses and industries that have been issued permits by MDE. If requested by the regulated community, MS4 staff will provide MDE's document, *Stormwater Pollution Prevention Guidance* and refer the business or industry directly to MDE for further guidance. If Harford County determines that a business or industry does not have an NPDES permit, but engages in activities that should be permitted, that information is forwarded to MDE for further action.

E. Restoration Plans and Total Maximum Daily Loads

In compliance with §402(p)(3)(B)(iii) of the CWA, MS4 permits must require stormwater controls to reduce the discharge of pollutants to the MEP. By regulation at 40 CFR §122.44, BMPs and programs implemented pursuant to this permit must be consistent with applicable WLAs developed under EPA approved TMDLs (see list of EPA approved TMDLs attached and incorporated as Attachment B).

Harford County shall annually provide watershed assessments, restoration plans, and opportunities for public participation, and TMDL compliance status to MDE. A systematic assessment shall be conducted, and a detailed restoration plan developed for all watersheds within Harford County. As required below, watershed assessments and restoration plans shall include a thorough water quality analysis, identification of water quality improvement opportunities, and a schedule for BMP and programmatic implementation to meet stormwater WLAs included in EPA approved TMDLs.

Watershed assessments are completed to systematically identify opportunities for watershed restoration. The completion of watershed assessments for the entire county is labor and cost intensive. The County has expressed this concern particularly the need to complete assessments in rural watersheds with minimal impervious area. The inventory within the urban watersheds in the county is significant and the likelihood of watershed restoration within these rural watersheds is fairly low. However, the County offers to satisfy this permit requirement by completing watershed assessments for the entire county, hereafter called large watershed assessments.

The County will continue to complete small watershed assessments to identify opportunities for watershed restoration that have the potential to be completed within a reasonable timeframe.

1. Watershed Assessments

a. By the end of the permit term, Harford County shall complete detailed watershed assessments for the entire County. Watershed Assessments conducted during the previous permit cycles may be issued to comply with this requirement provide the assessments include all the items listed in Part IV.E.a.b. below. Assessments shall be performed at an appropriate watershed scale (e.g. Maryland hierarchical eight or twelve –digit sub-basins) and be based on MDE's TMDL analysis or an equivalent and comparable County water quality Analysis.

b. Watershed assessments by the County shall:

i. Determine current water quality conditions;
ii. Include the results of a visual watershed inspection;
iii. Identify and rank water quality problems;
iv. Prioritize all structural and nonstructural water quality improvement projects; and
v. Specify pollutant load reduction benchmarks and deadlines that demonstrate progress toward meeting all applicable stormwater WLAs.

There are four major basins located within Harford County that include the Bush River, Lower Susquehanna River, Gunpowder River, and Upper Western Shore (Appendix E1). From these basins, large and small watershed assessments were conducted and are listed below along with the year completed.

The Bush River watershed has been the focus of the County's watershed restoration program. It contains most of the County's priority funding area, or development envelope, and therefore the highest concentration of urban impervious areas. The County completed an assessment of the Bush River watershed in 2003, which was the impetus for completing the County's first small watershed assessment in Wheel Creek and subsequent ones thereafter.

Large Watershed Assessments

Completed Large Watershed Assessments (241,000 acres)

Bush River (2003) – 75,000 acres
Deer Creek (2007) – 88,000 acres
Little Gunpowder River (2019) – 21,000 acres
Swan Creek (2019) – 16,000 acres
Lower Susquehanna River North (2019) – 8,000 acres
Lower Susquehanna River South (2019) – 8,000 acres
Broad Creek (2019) – 25,000 acres

Watershed Assessment Master Plan

A watershed restoration master plan was completed during the FY2017 reporting period. The master plan included a GIS desktop analysis used to assign a priority ranking to each of the County's subwatersheds and develop a schedule for conducting small watershed assessments. The analysis was based on percent impervious cover, current subwatershed conditions, and proximity to adjacent impacted subwatersheds. The County continues to use this plan to prioritize small watershed assessments.

Small Watershed Assessments

The following small watershed assessments have been completed and are available online at http://www.HarfordCountyMD.gov/HarfordStreams:

Completed Small Watershed Assessments (26,182 acres)

Wheel Creek (2008) - 440 acres
Plumtree Run (2011) - 1,650 acres
Sam's Branch (2012) - 370 acres
Foster Branch (2012) - 1,420 acres
Declaration Run (2014) – 430 acres
Riverside Area (2014) – 300 acres
Upper Bynum Run (2018) – 5,350 acres
Stout Bottle Branch /Cabbage Run (Deer Creek 2018) – 4,672 acres
Upper Farnandis Branch (2018) – 490 acres

Emmord Branch/Reardon Inlet (2018) – 1,010 acres
Taylor Creek (2018) – 697 acres
Middle/Lower Bynum Run (2019) – 9,262 acres

During this reporting period, no additional small watershed assessments were completed. The County currently has a large inventory of potential projects.

During this reporting period, the County completed the creation of a single GIS layer for all projects identified within each small watershed assessment and all projects identified within the original watershed restoration plans. The layer includes potential projects that treat a total of 3,290 impervious acres. A summary of the projects by basin is included in Appendix E1.

A summary of completed projects by small watershed assessment is included in Appendix E1.

2. Restoration Plans

a. Within one year of permit issuance, Harford County shall submit an impervious surface area assessment consistent with the methods described in the MDE document "Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated, Guidance for National Pollutant Discharge Elimination System Stormwater Permits" (MDE, June 2011 or subsequent versions). Upon approval by MDE, this impervious surface area assessment shall serve as the baseline for the restoration efforts required in this permit.

Impervious Area Assessment

In June 2020, MDE approved an updated impervious baseline of 10,953 acres. Three hundred two (302) acres of additional reductions in the impervious baseline are possible with additional analysis.

Baseline Impervious Acres Pending Approval (302)

Pre-2002 stormwater facilities - 187 acres

Non-rooftop disconnection - 79 acres

Watershed restoration projects through 2009 - 36

Pre-2002 Stormwater Facilities

Along with the development of the County's stormwater management asset management geodatabase, the County will verify during the next reporting period all pre-2002 stormwater management facilities providing water quality management.

Non-rooftop Disconnection

MDE requested the County verify 10% of the non-rooftop connections by conducting field visits. During this reporting period, the County reviewed the locations through a desktop exercise to determine the viability of conducting field visits. Since the County's evaluation was limited to parcels 5 acres or larger, field verification proved difficult since most houses on these large lots are not easily visible from public roadways. The County will consider updating the evaluation to include smaller parcels in order to create a larger inventory for field verification.

Watershed Restoration Projects through 2009

Two stormwater retrofits are currently failing inspections, one maintained by a homeowner's association and one maintained by the County.

A portion of the repairs for the County-maintained facility anticipated summer 2020 have been completed. The remaining repairs are now anticipated during the next reporting period. An additional 35.56 acres will be available for baseline reduction once repairs are completed.

The County stormwater management maintenance inspector will continue to coordinate with the HOA to complete the repairs for the other failing facility. The required repairs do not impact the water quality proportions of the retrofit and are therefore no removed from the baseline.

Grass Swales

During this reporting period, the County completed the grass swale assessment that included a reduction in baseline of 25 acres. The County submitted the assessment to MDE for review in April 2020. A copy of the completed assessment is included in Appenix E2.a.

> By the end of this permit term, Harford County shall commence and complete the implementation of restoration efforts for twenty percent of the County's impervious surface area consistent with the methodology described in the MDE document cited in PART IV.E.2.a. that has not already been restored to the MEP. Equivalent acres restored of impervious surfaces, through new retrofits or the retrofit of pre-2002 structural BMPs shall be based upon the treatment of the WQv criteria and associated list of practices defined in the 2000 Maryland Stormwater Design Manual. For alternate BMPs, the basis for calculation of equivalent impervious acres restored is based upon the pollutant loads from forested cover.

Watershed Restoration Projects

During this reporting period, six watershed restoration projects were completed for a total cost for design and construction of $5,993,022 (Appendix E2.a). Combined, these projects treat 245.0 impervious acres. One project was under construction at the end of this reporting period and 13 projects were under design. After the end of this reporting period, two projects were bid for construction. (Appendix E2.a.).

Watershed Restoration Projects (Completed) - 6

Annie's Playground Stream Restoration
Willoughby Beach Road Extended Stormwater Retrofits and Stream Restoration
Tributary to Plumtree Run at Wakefield Manor Stream Restoration
Plumtree Run Barrington Place Stream Restoration
Courthouse Bioretention
Mariner Point Tree Planting

Watershed Restoration Projects (Under Construction) - 1

Unnamed Tributary to Emmord Branch Stream Restoration

Watershed Restoration Project (Construction start post reporting period) - 2

Foster Branch at Stillmeadow Stream Restoration

Heavenly Pond Wetland & Stream Creation

Watershed Restoration Projects (Under Design) - 13

Fallston Library SWM Retrofit

Fallston Volunteer Firehouse SWM Retrofit

Sunnyview Drive Stream Restoration

Hickory Vet Retrofit

C Milton Wright SWM Retrofit & Stream Restoration

Church Creek Elementary School SWM Retrofit & Stream Restoration

Gavigans Retrofit

Jarrettsville Elementary School Retrofit

Northwest Branch Declaration Run Stream Restoration

Spenceola Retrofit

Woodland Run Stream Restoration

Watervale Creek Stream Restoration

Fallston Middle and High School SWM Retrofit & Stream Restoration

Additional credits may be available and will be reviewed during the next reporting period. Those credits include the addition of three stormwater step pool conveyance (SPSC) practices and the calculation of impervious credit for a stream restoration. Before credits for the SPSC practices are verified, the MS4 Office needs to confirm that the practices were approved and permitted as part of the stormwater review process. For one stream restoration, the impervious area credits were calculated using the load reductions from the stream protocols. These credits were significantly greater than credits calculated by linear foot. The review of the completed projects was completed by RKK and is included in Appendix E.2.a.

Through this reporting period, watershed restoration has been completed for a total of 874.7 impervious acres. The total cost for the restoration is $19.4 M with over forty percent funded through grants. The average cost per impervious credit is $69,818 (Appendix C6).

Stormwater retrofits are generally much more expensive to implement than stream restorations or tree plantings. Likewise, stormwater retrofits treat significantly less impervious

area per project and require much greater costs for long term maintenance. The median cost per impervious credit for design and construction is $28,531.

Watershed Restoration Project Inspections

During this reporting period, the County contracted with RK&K to conduct inspections of thirty-five tree planting areas for compliance with the triannual inspection requirement. The inspection included an assessment of the planting sites boundaries, the number of live trees per acre, maintenance needs and overall site conditions. Credits were updated based on this information.

Twenty-three (23) projects were inspected. One project was removed as restoration of the site is impractical. All or portions of six (6) sites failed inspections for a total of 3.93 impervious acres (Appendix E2.a). During the next reporting period, the County will contact all property owners to discuss proper maintenance and develop plans to restore failing areas. Inspection methods, results, site mapping and photos for each location are in included in Appendix E2.a.

Watershed Restoration Project Monitoring

Woodbridge Stream Restoration Post – Construction Monitoring

The County has contracted with KCI Technologies, Inc. to conduct post-construction monitoring for five years for the Woodbridge Stream Restoration project. This project was completed in April 2015 and this is the final year of post construction monitoring. The main purpose of this study is to document and analyze the current and future stability of the restoration project and to support the County in its efforts to comply with the Woodbridge Stream Restoration Joint permit # 2011-60634-M24. Post-construction monitoring is be conducted annually for five years and includes a geomorphic assessment, physical habitat assessment, riparian buffer planting evaluation, benthic macroinvertebrate assessments, structure inspections, and photographic documentation. The County will utilize an on call design build contractor to address the recommended maintenance issues that have been noted in the inspection and monitoring reports. The report documenting Year 5 of the monitoring efforts is included in Appendix E2.a.

Dembytown Stream Restoration Post – Construction Monitoring

The County has contracted with KCI Technologies, Inc. to conduct post-construction monitoring for five years for the Dembytown Stream Restoration project completed along an unnamed tributary to Foster Branch. This restoration project was completed in April 2017. Information

and data collected in this reach will be used to evaluate the success of the restoration project as required by the Army Corps of Engineers (ACOE) permit # 2015-60430-M37. These tasks include invasive plant and vegetation assessments, a geomorphology assessment, a physical habitat assessment, a wetland assessment, photo documentation, and a visual hydrologic assessment. The monitoring report documenting the methods, results and conclusions for Year 4 are included in Appendix E2.a.

Ring Factory ES Pond Retrofit and Stream Restoration Post-Construction Permit Monitoring

The County has contracted with WBCM to complete the post-construction monitoring for three years for the Ring Factory Elementary School Outfall and Stream Restoration project as required by permit #2016-60581-M37. This project was completed in June 2018 and included approximately 1,078 linear feet of stream restoration and re-establishment of 5,274 square feet of non-tidal wetlands. The scope addresses tasks required by the ACOE Nationwide Permit Ref. 2016-60581-M37 Special Conditions and includes a visual assessment and field walk, riffle crest profile and resources classification, vegetation species richness and invasive species assessment, stream habitat assessment, photo documentation, wetland delineation and hydric soil monitoring. The areas of concern noted during the previous monitoring period were addressed by the contractor. A copy of the Year 2 report is included in Appendix E2.a.

Bear Cabin Branch Stream Restoration Post-Construction Permit Monitoring

The County has contracted with Ecotone, Inc. to complete the post-construction monitoring for the Bear Cabin Branch Stream Restoration project as authorized by permit #2017-60285-M37. The three-year monitoring plan for the 4,078 linear feet of stream restoration includes a visual assessment of the reach, an evaluation of the structural stability by documenting changes in riffle cross sections and longitudinal profile, identification of necessary corrective measures, vegetation assessment, stream habitat assessment, and photo documentation. This project was completed in May 2018, and a copy of the Year 3 Report is included in Appendix E2. a.

Bynum Run at St. Andrews Stream Restoration Post-Construction Permit Monitoring

The County has contracted with Ecotone, Inc. to conduct the post-construction monitoring of the Bynum Run at St. Andrew's Stream Restoration project as authorized by permit #2014-60352-M37. The five-year monitoring plan for the 3,345 linear feet of stream restoration includes a visual assessment of the reach, an evaluation of the structural stability by documenting changes in riffle cross sections and longitudinal profile, identification of necessary corrective measures, vegetation assessment, stream habitat assessment, and photo

documentation. This project was completed in May 2019, and a copy of the Year 2 report is included in Appendix E2.a.

Emmord Branch Stream Restoration Permit Monitoring

The County has contracted with WBCM, Inc. to conduct pre- and post-construction monitoring for the Emmord Branch Stream Restoration project. This is a three-year post-construction effort, and the information and data collected in this reach will be used to evaluate the success of the restoration project as required by the Army Corps of Engineers (ACOE) permit # 2018-61811-M37. These tasks include invasive plant and vegetation assessments, a geomorphology assessment, a physical habitat assessment, and a visual hydrologic assessment. Construction completed in October 2020. The As-built monitoring report is included in Appendix E2.a.

Willoughby Beach Stream Restoration Permit Monitoring

The County has contracted with KCI, Inc. to conduct pre- and post-construction monitoring along Sam's Branch for the Willoughby Beach Stream Restoration project. This is a three-year post-construction monitoring effort, and the information and data collected in this reach will be used to evaluate the success of the restoration project as required by the Army Corps of Engineers (ACOE) permit # 2016-60665-M37. These tasks include invasive plant and vegetation assessments, a geomorphology assessment, a physical habitat assessment, biological assessment (fish only), a wetland assessment, and a visual hydrologic assessment. Construction was completed in April 2020. The As-built monitoring report is included in Appendix E2.a.

Annie's Playground Stream Restoration Post-Construction Monitoring

The County contracted with Ecotone, Inc. to complete the post-construction monitoring for the Annie's Stream Restoration project as authorized by permit #2018-60177-M12. The project included the restoration of 3,610lf of stream on an unnamed tributary to Winters Run using a natural channel design plan. Construction was completed in September 2019. The post construction monitoring report is included in Appendix E2.a.

Barrington Stream Restoration Post-Construction Monitoring

The County has contracted with KCI, Inc. to conduct pre- and post-construction monitoring along an unnamed tributary to Plumtree Run for the Barrington Stream Restoration project. This is a five year post-construction monitoring effort, and the information and data collected in this reach will be used to evaluate the success of the restoration project as required by the

Army Corps of Engineers (ACOE) permit # 2016-60198. These tasks include invasive plant and vegetation assessments, a geomorphology assessment, a physical habitat assessment, a wetland assessment, and a visual hydrologic assessment. Construction was completed in April 2020. The As-built/Year 1 monitoring report is included in Appendix E2.a.

Connections to the Wastewater Treatment Plant

In fiscal year 2017, the MS4 Office began setting aside funds to assist with the connection of failing septic systems to the wastewater treatment plant. A grant of $4,500 is used to pay a portion of the required hookup fees, reducing the overall financial commitment for the property owners. Since this program began, the MS4 Office has been able to assist in the connection of 22 properties to the wastewater treatment plant.

During this reporting period, 13 septic systems were abandoned and connected to the wastewater treatment plant for a total of 5.07 impervious acres treated (Appendix C6).

Septic System Upgrades

The Health Department manages the program for upgrading septic systems through the use of Bay Restoration Funds. The MS4 Office obtains this information on an annual basis for inclusion within this annual report. For fiscal year 2020, the Health Department did not reply to the MS4's Office request for information, likely due to their schedules responding to the corona virus. (Appendix C6).

Septic System Pump Outs

For this reporting period, the County contracted again with RKK to review each manifest completed by septic haulers that dropped off at the County's wastewater treatment plant, Sod Run. The manifests included septic pump outs, holding tanks, and commercial waste. A total of 6,763 manifests were for septic pump outs. One thousand four hundred seventy nine (1,479) manifests for 22% were credited in FY2019. Five hundred thirty nine (539) manifests or approximately 8% were excluded. Exclusions included landfill leachate, manifests with missing addresses, addresses outside of Harford County, and porta potties. A summary of the work completed is included in Appendix E2.a.

During this reporting period, 4,516 septic tanks were pumped out for a total of 135.5 impervious acres treated (Appendix C6).

Based on the expert panel (2014), Chesapeake Bay Model 5.3.2 load reductions for septic pump out are based on a 1,000 gallon tank with 2.5 people per household. The assumptions for the load calculations also include accumulation of solids over a five-year timeframe, allowing for load reductions per address once every five years. It is unknown currently if there are load reductions for commercial properties, consideration for pump outs more frequently than every five years, or consideration for pump outs from holding tanks.

The septic pump outs by volume for fiscal year 2020 was reviewed. Fifty four percent (54%) of the pump outs were less than 1,200 gallons, potentially indicating residential tanks larger than the average assumed by the expert panel and / or commercial tanks (Appendix E2.a). An average tank size of 1,307 gallons was calculated for FY2020, slightly lower than 1,368 gallons calculated for FY2019. Additional research of the county's manifests will continue during the next reporting period.

Restoration Credits

Portions of eight (8) watershed restoration projects have significant repairs or 21.93 impervious acres (1 retrofit = 3 acres, 1 stream restoration = 15 acres, 6 tree plantings = 3.93 acres). (Appendix E2.a).

Through this reporting period, watershed restoration has been completed for 1,122.6 impervious acres, or 10.2% of the untreated impervious area.

As of the submittal of this report, an additional 20 impervious acres were under construction, 55 impervious acres had signed construction contracts, and 569 impervious acres were under design, for a total of 664 impervious acres, or 62% of the needed credits to meet the County's watershed restoration requirement.

Identified Watershed Restoration Projects

During the previous reporting period, the County completed a GIS layer that contains all propsed projects from small watershed assessements and watershed restoration plans. Details about the development of the GIS is layer is included in Appendix E1. This list of identified projects has anticipated credits of 3,290 impervious acres (Appendix E2.a).

b. Within one year of permit issuance, Harford County shall submit to MDE for approval a restoration plan for each stormwater WLA approved by EPA prior to the effective date of the permit. The County shall submit restoration plans for subsequent TMDL WLAs within one year of EPA approval. Upon approval by MDE, these restoration plans will be enforceable under this permit. As part of the restoration plans, Harford County shall:

i. Include the final date for meeting applicable WLAs and a detailed schedule for implementing all structural and nonstructural water quality improvement projects, enhanced stormwater management programs, and alternative stormwater control initiatives necessary for meeting applicable WLAs;

ii. Provide detailed cost estimates for individual projects, programs, controls, and plan implementation;

iii. Evaluate and track the implementation of restoration plans through monitoring or modeling to document the progress toward meeting established benchmarks, deadlines, and stormwater WLAs; and

iv. Develop an ongoing, iterative process that continuously implements structural and nonstructural restoration projects, program enhancements, new and additional programs, and alternative BMPs where EPA approved TMDL stormwater WLAs are not being met according to the benchmarks and deadlines established as part of the County's watershed assessments.

Watershed Restoration Plans

Swan Creek Restoration Plan

On September 19, 2019, MDE approved the County's plan (Appendix E2.b). On January 26, 2020, the County provided additional information as requested (Appendix E2.b).

Bynum Run Restoration Plan

An updated restoration plan for Bynum Run sediment TMDL was submitted with the FY2019 Annual Report. On April 27, 2020, MDE provided conditional approval of the plan (Appendix E2.b.). The County will submit the additional information requested no later than March 1, 2020.

Bush River Restoration Plan

An updated restoration plan for Bush River PCB TMDL was submitted with the FY2019 Annual Report. On April 27, 2020, MDE requested updates to the plan (Appendix E2.b). The County will submit the requested updates no later than March 1, 2020.

Chesapeake Bay and Bynum Run Restoration Plans

During this reporting period, the County continued to make progress towards finalizing the Chesapeake Bay Restoration Plan but did not complete the plan as anticipated by December 30, 2020.

The County used the newly created assessment GIS layer to begin to develop CAST input files for the proposed projects. The data included in the GIS layer is outlined in Appendix E1. The data is structured to provide easy input for the creation of new input files as projects are added or removed.

Input files have been developed for completed projects. All stormwater facilities have been categorized as RR or ST facilities. The LoadSourceGroup for the stormwaater facilities still needs to be populated. The County requests guidance from MDE about the appropriate category to use. The 2010 baseline BMPs use "ms4cssnonregulated". Portions of projects completed during this reporting period have been included in the table that need additional verification as discussed above. Those projects have missing identification numbers (Appendix2b).

Input files have been developed for active projects. Only impervious acres treated are estimated for these projects. Detailed information for treatment is needed to complete these input files (Appendix E2.b).

No later than March 1, 2020, the County will provide MDE with updates on the status of the Chesapeake Bay Restoration Plan. A copy of the spreadsheet with the input files was submitted with this report.

Watershed Restoration Monitoring

USGS Stream Gages

Harford County and the United States Geological Survey (USGS) partnered for the continued operation of the following gages through June 2020.

Bynum Run at Bel Air (01581500) – restarted 1999
Plumtree Run near Bel Air (01581752) – installed 2001
James Run near Belcamp (01581649) – installed 2004
Swan Creek at Swan Creek (01580700) – installed 2007
Wheel Creek near Abingdon (0158175320) – installed 2009
Foster Branch near Joppatowne (01585075) – installed 2015

The operation of these gages supports the ongoing efforts to create a state-wide stream gaging network, and the data will supplement information recorded at additional Harford County gages that are not funded by the County. The data collected at each of these gages is presented in 'real-time' at http://waterdata.usgs.gov/md/nwis/rt.

MS4 staff partnered with the USGS in 2013 to monitor the water quality in the Plumtree Run watershed and again in 2015 to replicate the same monitoring plan in the Foster Branch watershed. The County developed long - term restoration plans for both of these watersheds and is conducting monitoring activities through a single, coordinated strategy rather than by monitoring each individual stream restoration projects in each watershed. All water quality monitoring is conducted at the Plumtree Run gage (USGS monitoring station 01581752) and the Foster Branch gage (USGS monitoring station 01585075), and site operation is designed to be compatible with the Chesapeake Bay Nontidal Monitoring Network (NTN) to maintain the ability to compare conditions observed at this station to those measured across the region. The monitoring plan consists of samples collected on a monthly fixed-frequency interval augmented

with samples collected during eight to ten storm events that are analyzed for nutrients, suspended sediment, and dissolved chloride and *E. coli* bacteria. Continuous water quality monitoring data for water temperature, specific conductance and turbidity is also collected and displayed in near real time on the USGS web page.

Data collected for this study will be used to detail current water quality conditions in Plumtree Run and Foster Branch and document improvements to water quality as watershed restoration activities are implemented in the watershed. All data is reviewed and posted in the USGS National Water Information System (NWIS) and published in the USGS annual data report of the MD-DE-DC Water Science Center available at http://wdr.water.usgs.gov/. The County is anticipating developing a cumulative review of this data during the next reporting period.

USGS Precipitation Gages

Harford County partnered with the USGS during this reporting period and added four additional precipitation gages to expand the spatial network of continuous, near real time precipitation monitoring in the County. All stations are self-contained, consisting of a precipitation sensor, an electronic data recorder, a satellite radio with related antennas, batteries and a solar panel and all data are recorded at five-minute intervals. The gages were installed on County owned property in the December 2019 and include the following locations:

Anita C. Leight Estuary Center (392702076162801)
Churchville Parks and Recreation Complex (393351076141301)
Norrisville Library & Parks and Recreation Complex (394205076320301)
Whiteford Highway Maintenance Shop (394236076210801)

In addition to MS4 utilizing the precipitation data for water resources efforts, data from these gages also support the County Highways personnel and the Emergency Managers during severe weather and flooding events.

Plumtree Run and Foster Branch Monitoring Plans

The MS4 staff contracted with KCI Technologies to develop monitoring plans for the Plumtree Run and Foster Branch watersheds. The primary goal of this effort is to characterize baseline biological, physical habitat, and chemical stream conditions prior to the implementation of additional stream restoration projects. A secondary goal is to have a monitoring plan which

also serves to collect data that can be used to document ecological uplift as restoration projects are completed within these watersheds.

Both monitoring plans follow a Before-After, Control-Impact (BACI) study design. By implementing this monitoring plan before more projects are implemented, a baseline condition can be described; the "Before" portion of the BACI. By continuing with this effort far enough in the future to collect data after project implementation, the "After" portion of the BACI concept is captured as well. Plumtree Run and Foster Branch are the watersheds where these treatments will be applied, the "Impact" portion of the BACI concept. A local urban/suburban reference/control site is nearby; the "Control" portion of the BACI design. The County and KCI feel this is the best strategy for measuring ecological response or ecological lift to the implementation of the Plumtree Run and Foster Branch Watershed Small Watershed Action Plans.

Five in-stream monitoring sites are located in each watershed and were assessed for benthic macroinvertebrates, spring and summer physical habitat, fish, herpetofauna, invasive plants and in situ water chemistry. Sampling methods used are consistent with the Maryland Biological Stream Survey (MBSS) procedures (DNR, 2015). The MBSS protocols are standard for biomonitoring efforts across Maryland. Using these MBSS protocols will allow a direct comparison to DNR-collected data, allowing use of a 4,700+ stream site dataset for comparison with results from Plumtree Run and Foster Branch.

To date, five years of data has been collected in Foster Branch, and two stream restoration projects were completed in the watershed. Mean BIBI scores ranged from 2.14 ('Poor') to 3.17 ('Fair'), and mean FIBI scores ranged from 2.87 ('Poor') to 3.22 ('Fair'). The changes in mean BIBI and FIBI score over time were not statistically significant. Given the relatively short period of time post-construction, ecological uplift may not yet be measurable. Also, proximity to source populations of more sensitive benthic macroinvertebrates and fish may limit ecological uplift even with improved habitat conditions.

To date, five years of data has been collected in the Plumtree Run watershed. Mean BIBI scores ranged from 1.73 to 1.53 all rating 'Very Poor', and mean FIBI scores were generally greater; in the 'Poor' and 'Fair' categories and ranged from 2.67 ('Poor') to 3.73 ('Fair'). The changes in mean BIBI and FIBI score over time were not statistically significant. Both BIBI and FIBI scores at each Plumtree Run site vary slightly from year to year with no discernable pattern.

Foster Branch and Plumtree Run Monitoring reports for Year 5 are included in Appendix E2. b.

Bush River Watershed PCB Proposed Source Trackdown Study

The County has developed a draft Bush River Watershed PCB Source Trackdown Study in cooperation with the University Of Maryland Baltimore County (UMBC). The proposed work will included a systematic study of the water column PCB concentrations at select sites in the tidal portions of the Bush River and contributing non-tidal tributaries. This proposed effort will use a combination of integrated passive sampling, bulk sediment sampling, and periodic water quality sampling to determine the PCB concentration loads and the potential location of inputs. A draft proposal is included in Appendix E2.b. The County also proposes to develop a more detailed trackdown effort within the watershed to identify potential upland sources of PCBs and to implement a stream bracketing approach to determine which subwatersheds contribute the greatest relative PCB concentration. This efforts may include but are not limited to a more extensive desktop analysis, passive and in-stream sediment sampling, and an analyses of dredged materials.

3. Public Participation

Harford County shall provide continual outreach to the public regarding the development of its watershed assessments and restoration plans. Additionally, the County shall allow for public participation in the TMDL process, solicit input, and incorporate any relevant ideas and program improvements that can aid in achieving TMDLs and water quality standards. Harford County shall provide:

a. Notice in a local newspaper and the County's website outlining how the public may obtain information on the development of watershed assessments and stormwater watershed restoration plans and opportunities for comment;

b. Procedures for providing copies of watershed assessments and stormwater watershed restoration plans to interested parties upon request;

c. A minimum 30-day comment period before finalizing watershed assessments and stormwater watershed restoration plans; and

d. A summary in each annual report of how the County addressed or will address any material comment received from the public.

Upper Bynum Run Small Watershed Assessment

The Upper Bynum Run Small Watershed Assessment was completed during the previous reporting period. An interactive, online GIS Story Map was created outlining the importance of healthy streams and summarizing the purpose and findings of the assessment. The Story Map was hosted on the server of the consultant that completed the assessment, and there have been some challenges migrating the story map on to the County server. Once successfully uploaded to the County server, the story map will be available for property owners to comment on the assessment.

Middle/Lower Bynum Run Small Watershed Assessment

The Middle/Lower Bynum Run Small Watershed Assessment was completed during the previous reporting period. An interactive, online GIS Story Map was created outlining the importance of healthy streams and summarizing the purpose and findings of the assessment. During this reporting period, 1,437 property owners near or adjacent to a storm water management facility or the stream were mailed a post card with a link to the Story Map as a means to provide comments about the assessment. Of the 1,437 post cards that were mailed, the County received ten email and two phone responses. Five of the twelve comments require a follow up field visit with the property owner, while the remaining seven warranted only a follow up email or phone call. A copy of the residents' comments are included in Appendix E.3.

4. TMDL Compliance

Harford County shall evaluate and document its progress toward meeting all applicable stormwater WLAs included in EPA approved TMDLs. An annual TMDL assessment report with tables shall be submitted to MDE. This assessment shall include complete descriptions of the analytical methodology used to evaluate the effectiveness of the County's restoration plans and how these plans are working toward achieving compliance with EPA approved TMDLs. Harford County shall further provide:

a. Estimated net change in pollutant load reductions from all completed structural and nonstructural water quality improvement projects, enhanced stormwater management programs, and alternative stormwater control initiatives;

b. A comparison of the net change in pollutant load reductions detailed above with the established benchmarks, deadlines, and applicable stormwater WLAs;

c. Itemized costs for completed projects, programs, and initiatives to meet established pollutant reduction benchmarks and deadlines;

d. Cost estimates for completing all projects, programs, and alternatives necessary for meeting applicable stormwater WLAs; and

e. A description of a plan for implementing additional watershed restoration actions that can be enforced when benchmarks, deadlines, and applicable stormwater WLAs are not being met or when projected funding is inadequate.

For the projects constructed during this reporting period, load reductions were calculated by the design engineers and verified by RKK. A copy of their review is included in Appendix E2.a). A portion of the projects completed during this reporting period need additional verification as discussed above.

In Appendix E3, the County has included a summary of the allocations for the Chesapeake Bay and for Bynum Run. The summary includes Chesapeake Bay nitrogen allocations and Bynum Run sediment allocations from the FY2019 Annual Report review that do not match the information from the MDE TMDL Data Center. Additional discussion with MDE is needed to rectify the difference.

Based on past expenditures and loads achieved, the County developed target load reductions for FY2025. An estimated $32 M is anticipated to be available for the implementation of watershed restoration projects over the next five fiscal years.

Once the County finalizes the development of the spreadsheet to align with the Phase 6 Bay Model, all project load reductions will be calculated using this method. A summary of the load reductions is included in Appendix E4.

F. Assessment of Controls

Harford County and ten other municipalities in Maryland have been conducting discharge characterization monitoring since the early 1990s. From this expansive monitoring, a statewide database has been developed that includes hundreds of storms across numerous land uses. Analyses of this dataset and other research performed nationally effectively characterize stormwater runoff in Maryland for NPDES municipal stormwater purposes. To build on the existing information and to better track progress toward meeting TMDLs, better data are needed on ESD performance and BMP efficiencies and effectiveness.

Assessment of controls is critical for determining the effectiveness of the NPDES stormwater management program and progress toward improving water quality. The County shall use chemical, biological, and physical monitoring to assess watershed restoration efforts, document BMP effectiveness, or calibrate water quality models for showing progress toward meeting any applicable WLAs developed under EPA approved TMDLs identified above. Additionally, the County shall conduct physical stream monitoring to assess the implementation of the latest version of the 2000 Maryland Stormwater Design Manual. Specific monitoring requirements are described below.

1. Watershed Restoration Assessment

The County shall continue monitoring in the Wheel Creek watershed or select and submit for MDE's approval a new watershed restoration project for monitoring. Monitoring activities shall occur where the cumulative effects of watershed restoration activities can be assessed. One outfall and an associated in-stream station, or other locations based on a study design approved by MDE, shall be monitored. The minimum criteria for chemical, biological, and physical monitoring are as follows:

Wheel Creek Watershed Background

In 2009, MS4 staff and MDE selected the Wheel Creek watershed to monitor ambient conditions. The Wheel Creek watershed (unofficially named) is centrally located in Harford County, approximately three miles south of the Town of Bel Air. It is a second order tributary to Winters Run (MDE8DIGIT 02130702) and Atkisson Reservoir (MDE8DIGIT 02130703) in the Bush River watershed (MDE6DIGIT 021307). Wheel Creek is situated along the eastern edge of the Piedmont physiographic province, drains 435 acres, and contains approximately 27% impervious cover. A mixture of commercial and high-density residential land use dominates the headwaters, along with a mixture of medium and low density residential land use. The Harford Glen Environmental Education Center, which is part of the Harford County Public School system, is in the lower reaches of the watershed and is predominately forest.

Wheel Creek Watershed
435 acres
27% impervious cover

This watershed was selected based on the channel instability, sedimentation, pond retrofit, and stream restoration opportunities and implementation recommendations outlined initially in the *Bush River Water Restoration Action Strategy* and more detailed in the *Wheel Creek Small Watershed Assessment*.

Wheel Creek Small Watershed Assessment

The priority restoration projects recommended in the 2008 Wheel Creek Small Watershed Assessment have been constructed. The following is a summary of each project along with the completion date.

Constructed
Gardens of Bel Air SWM Retrofit (2013)
Calvert's Walk Stream Restoration (2013)
Festival at Bel Air SWM Retrofit (2015)
Country Walk 1A SWM Retrofit (2015)
Phase 1 - Lower Wheel Creek Stream Restoration and WQ Facilities (2016)
County Walk 1B SWM Retrofit (2017)
Phase 2 - Lower Wheel Creek Stream Restoration (2017)

Project success will be evaluated through a pre- and post-construction monitoring effort that includes chemical, biological and physical monitoring components that began in January 2009.

a. Chemical Monitoring:

i. Eight (8) storm events shall be monitored per year at each monitoring location with at least two occurring per quarter. Quarters shall be based on the calendar year. If extended dry weather periods occur, baseflow samples shall be taken at least once per month at the monitoring stations if flow is observed;

ii. Discrete samples of stormwater flow shall be collected at the monitoring stations using automated or manual sampling methods. Measurements of pH and water temperature shall be taken;

iii. At least three (3) samples determined to be representative of each storm event shall be submitted to a laboratory for analysis according to method listed under 40 CFR Part 136 and event mean concentrations (EMC) shall be calculated for:

Biochemical Oxygen Demand (BOD5)	Total Lead
Total Kjeldahl Nitrogen (TKN)	Total Copper
Nitrate plus Nitrite	Total Zinc
Total Suspended Solids	Total Phosphorus
Total Petroleum Hydrocarbons (TPH)	Hardness
E. coli or enterococcus	

iv. Continuous flow measurements shall be recorded at the in-stream monitoring station or other practical locations based on the approved study design. Data collected shall be used to estimate annual and seasonal pollutant loads and reductions, and for the calibration of watershed assessment models. Pollutant load estimates shall be reported according to any EPA approved TMDLs with a stormwater WLA.

Wheel Creek Chemical Monitoring Sites

Three permanent water quality monitoring stations were established in the Wheel Creek watershed between the summer of 2010 and the spring of 2011.

Station WC002 (In-stream)
Located on the mainstem of Wheel Creek just downstream of Wheel Road

Station WC003 (Outfall)
Located on the Middle Branch of Wheel Creek
Outfall from the instream SWM facility on Cinnabar Lane

Station WC004 (In-stream)
Located upstream of WC003 on the Middle Branch just off Wheel Court

Chemical Sample Analysis

Each sample collected in Wheel Creek was analyzed for the parameters listed in the table below using Standard Methods or EPA methods. Suburban Testing Laboratory and Harford County's Sod Run WWTP laboratory analyzed the stormflow and baseflow samples for all parameters except for *Escherichia coli* which were analyzed by Enviro-Chem Laboratory.

Parameter	Method	Reporting Limit
5-day Biological Oxygen Demand (BOD5)	SM 5210 B	0.9-1 mg/L
Total Suspended Solids (TSS)	SM 2540 D	1-3 mg/L
Total Kjeldahl Nitrogen (TKN)	EPA 351.2	0.5 mg/L
Total Phosphorus (TP)	EPA 365.4	0.005-0.01 mg/L
Total Petroleum Hydrocarbons (TPH)	EPA 1664BSGT@PHC	5 mg/L
Total Copper (Cu)	EPA 200.7 Rev 4.4	0.002-0.004 mg/L
Total Zinc (Zn)	EPA 200.7 Rev 4.4	0.01-0.02 mg/L
Total Lead (Pb)	EPA 200.7 Rev 4.4	0.001-0.002 mg/L
Total Hardness	CALC (200.8)	10-20 mg/L
Total Nitrate (NO3) + Nitrite (NO2)	EPA 300.0	0.2 mg/L
E. coli	SM 9223B	1 MPN/100mL

Wheel Creek Chemical Monitoring Results

Wheel Creek Year 10 Monitoring Results

The water quality monitoring results include baseflow and stormflow concentration data, event mean concentration (EMC) values and pollutant loading results collected from July 2019 through June 2020. During this reporting period, the County continued to contract with Versar, Inc. to collect samples during stormflow events. A total of 8 storm events were collected at Stations WC002, WC003 and WC004. When a storm event was sampled, three water quality samples were collected and composited at each station over the course of the storm hydrograph. Storm event sampling dates are listed below. Continuous flow was collected at each station during each storm event utilizing SIGMA area velocity probes or ISCO bubbler flow meters. The instantaneous discharge, level, velocity, water temperature and pH were recorded at the time the samples were collected.

Stormflow Sampling Dates	
October 7, 2019	February 5, 2020
October 9, 2019	February 12, 2020
October 22, 2019	April 12, 2020
December 9, 2019	June 20, 2020

During this reporting period, Versar staff collected discrete baseflow samples at each station during 12 baseflow events.

Baseflow Sampling Dates	
July 29, 2019	January 7, 2020
August 22, 2019	February 18, 2020
September 24, 2019	March 10, 2020
October 15, 2019	April 23, 2020
November 22, 2019	May 12, 2020
December 4, 2019	June 19, 2020

The MS4 Office continued to contract with Versar to develop a detailed analysis of the sampling methods, materials, data results and discussion for year ten of this monitoring effort. The final monitoring report is included in Appendix F1. A summary of the results is outlined below.

Federal and State reference values for certain nutrients were exceeded on several occasions, confirming detrimental stream chemistry impacts from development and changes in land use. Total nitrogen, calculated from the sum of nitrate plus nitrite and TKN, was present at concentrations exceeding the EPA reference values (0.69 mg/L) for both baseflow (all detected samples) and stormflow (all detected samples). For total phosphorus, none of the baseflow samples and 52.8% of the detectible results in stormflow samples were found to be above the corresponding EPA reference concentration (0.03656 mg/L). No reported chloride concentrations in stormflow samples exceeded the EPA acute criterion (860 mg/L), while 16.7% of baseflow samples exceeded the chronic criterion for chloride (230 mg/L).

All baseflow samples had detectable amounts of zinc but none exceeded the MDE chronic surface water criterion (120 µg/L). Of the stormflow samples, 94.4% had detectable concentrations of zinc, but none exceeded the MDE acute criterion (120 µg/L). All lead concentrations fell below the MDE acute criterion (65 µg/L) for stormflow and the chronic criterion (2.5 µg/L) for baseflow this monitoring period. Copper concentrations did not exceed the MDE chronic criterion (9 µg/L) in baseflow samples, while 5.6% of stormflow samples exceeded the acute criterion (13 µg/L).

E. coli bacteria concentrations were detected in all baseflow samples at all stations, ranging in concentration from 8.5 to 1,990 MPN/100ml. *E. coli* concentrations were equal to or greater than the maximum reportable result in 19.0% of stormflow grab samples, down from 33.3% in the 2018-2019 monitoring period. TPH was not detected above the reporting limit in any of the baseflow or stormflow grab samples collected at the monitoring stations.

Average baseflow concentrations of combined nitrate plus nitrite, chloride, copper, and zinc were highest at Station WC004 compared to the other two stations downstream. Samples collected at Station WC003 had the highest average concentrations of TKN, lead, and *E. coli* during baseflow conditions. Station WC002 samples had the highest average concentrations of BOD, ammonia, and TSS at baseflow. Average stormflow EMCs were highest at Station WC004 for lead, zinc, and *E. coli*. Average EMCs for BOD, ammonia, nitrate plus nitrite, TKN, total phosphorus, and copper were highest at Station WC002. At Station WC003, only TSS and chloride were highest of the three stations.

Average stormflow loads were highest at Station WC002 and lowest at Station WC004 for all parameters. Since discharge volume for a given storm increases with distance downstream, maximum load results at Station WC002 are expected.

Suspended sediment transport correlated moderately with discharge at Station WC002 (r^2 = 0.63) and showed a low correlation at Stations WC003 (r^2 = 0.30) and WC004 (r^2 = 0.21). As in past monitoring periods, the sediment results have correlated better with discharge at the station having the largest contributing watershed area.

Comparisons of pre-restoration and post-restoration pollutant load and concentration data were performed to determine the overall benefit to watershed conditions as a result of the implementation the restoration projects. Restoration activity initiated in late summer 2012 and concluded in spring 2017, allowing a post-restoration body of data to be accumulated. Subwatershed-level and total watershed benefits were evaluated by leveraging the placement of monitoring stations in relation to the restoration projects and completion timelines. A summary of the restoration effectiveness is included in the final report. The results are defined through time series plots of annual average EMCs and MCs, comparison of ratios of average concentrations and loads at Stations WC003 and WC002, determined first under pre-restoration conditions and then under post-restoration conditions, time-series statistical test performed on baseflow concentration and individual storm EMC data, and comparing ratios of concentration data.

Wheel Creek - Continuous Flow Monitoring

In 2012, DNR installed stream level loggers at stations WC002, WC003, and WC004 and up until June 30, 2016, operated and maintained them as well. On July 1, 2016, Versar assumed the responsibility of the operation and maintenance of those loggers. DNR methodologies have been applied and modified as needed. Flow rates were estimated for each station from five-minute level data and using a power-function rating curve. The rating curves were derived using a combination of physically measured flow rates at the station and hydraulic computations. This flow rate data, along with flow meter data collected during individual storm events and USGS data was used to calculate event mean concentrations (EMC) and pollutant loading calculations.

US Geological Survey

Harford County continued to partner with the U.S. Geological Survey for Water Year 2020 to operate and maintain a precipitation gage and a continuous-record streamflow-gaging station. The flow gage is located on Wheel Creek approximately 250 feet upstream of the confluence with Winters Run at Atkisson Reservoir, and the precipitation gage located in Atkisson Reservoir, 0.7 miles upstream of Atkisson Dam.

The gaging station collects stage data by use of a non-submersible pressure transducer system and is interfaced with a Data Collection Platform (DCP) to transmit the data in near real-time to the USGS Maryland-Delaware-DC Water Science Center public webpage. The following items/products were produced by USGS from the operation of streamflow-gaging station:

(1) A continuous 5-minute recording interval record of gage heights made available to the public in near real-time,

(2) A stage-discharge relation developed using conventional discharge measurements and corresponding gage heights,

(3) A record of datum corrections and rating shifts,

(4) A record of computed unit-value discharge data with mean daily flows and yearly flow statistics,

(5) Documentation of data analysis, data-quality checks, final data review, and

(6) Publication of computed daily discharge values in the USGS Annual Water-Data Report. Precipitation gage data is collecting using a tipping bucket rain gage. Data collected at the Wheel Creek gages are available in 'real-time' at http://waterdata.usgs.gov/md/nwis/rt.

b. Biological Monitoring:

i. Benthic macroinvertebrate samples shall be gathered each spring between the outfall and in-stream monitoring locations or other practical locations based on an approved study design; and

ii. The County shall use the EPA Rapid Bioassessment Protocols (RBP), Maryland Biological Stream Survey (MBSS), or other similar method approved by MDE.

Wheel Creek Biological Monitoring Sites

In 2009, Harford County MS4 Office and Maryland Biological Stream Survey (MBSS) staff selected eight biological monitoring stations in support of the Wheel Creek restoration project and the Chesapeake and Atlantic Coastal Bays Trust Fund. Seven stations are located in Wheel

Creek and one is located in an adjacent reference watershed. The monitoring stations were selected based on the location of stream restoration and stormwater retrofit projects proposed throughout the watershed. In 2015, the number of monitoring stations was decreased to four. With the current monitoring design, the goal is to assess the benefits of individual projects on biological communities and assess the efficacy of individual restoration techniques. This could potentially provide valuable data to guide the selection of restoration techniques in the future.

During this reporting period, the County contracted with KCI to complete the biological sampling. Each site was sampled during the spring and summer sampling periods. During the spring, sites were sampled for water chemistry, physical habitat, and presence of vernal pools, herpetofauna, and benthic macroinvertebrates. These same sites were also sampled in the summer for fish, crayfish, freshwater mussels, reptiles, amphibians, invasive riparian vegetation, and instream habitat. Sampling was conducted following the *Maryland Biological Stream Survey Sampling Manual: Field Protocols* (Stranko, et. al, 2010).

Wheel Creek Biological Monitoring Results

Biological results indicate that the streams within the Wheel Creek Watershed are typical of those in urbanized areas of Maryland's Piedmont. Several sites are degraded by multiple stressors resulting from land disturbance, channel alternation and the hydrologic and thermal stressors associated with upstream impervious surfaces. Ecological condition at the three treatment sites in Wheel Creek vary over time throughout the twelve years of data collection with no apparent pattern. BIBI scores at all four sites have remained in the 'Very Poor' or 'Poor' categories, varying slightly from year to year. FIBI scores at the three Wheel Creek treatment sites also vary some over time, but generally in the 'Fair' category. The urban control site, LWIN-108-X, has had FIBI scores in the 'Good' category that varied less than the Wheel Creek sites over the twelve years of record. Looking at the pre- and post-restoration periods, there is no discernable ecological lift in the IBI scores. The ecological condition of Wheel Creek, especially the benthic macroinvertebrate community, continues in a degraded condition similar to other post-restoration urban streams in central Maryland (Hilderbrand et al 2019; Southerland et al 2018).

A comprehensive analysis of data collected at Wheel Creek project sites will occur at the end of 2024. This larger analysis will integrate all ecological, habitat, and water quality data to try to identify correlations in the data set that would help understand what is affecting ecological condition in the Wheel Creek watershed. Analysis will focus not only on the IBI scores, but on

individual metrics and species-level response over time to try and highlight changes, if any exist, in the post-restoration data.

A summary of the biological data collected from 2009 – 2020 is included in Appendix F1.

c. Physical Monitoring:

i. A geomorphologic stream assessment shall be conducted between the outfall and in-stream monitoring locations or in a reasonable area based on the approved study design. This assessment shall include an annual comparison of permanently monumented stream channel cross-sections and the stream profile;

Wheel Creek Geomorphologic Monitoring Sites

In 2010, four assessment reaches were established to assess the geomorphic stability of the stream channels in the Wheel Creek watershed as they respond to restoration activities. Assessment techniques include a survey of permanently-monumented channel cross-sections, a longitudinal profile survey, particle size analysis, substrate facies mapping (Pre-Restoration, Year 1 only), and an assessment of bank pins and scour chains (Pre-Restoration, Years 1 through 4). The monitoring locations were based on the following criteria:

Station WC01
Within a proposed stream stabilization reach

Station WC02
Downstream of a stream stabilization reach and BMP retrofit location

Station WC03
Downstream of a BMP retrofit location only

Station WC04
Control site with no proposed restoration activities

The geomorphic monitoring was not conducted when there was active construction occurring on Lower Wheel Creek at Station WC01. Once the construction was completed in March 2017, the geomorphic monitoring resumed. Versar re-established Stations WC01 and WC02 because the benchmark monuments were damaged at both stations during construction. A longitudinal profile of each reach was re-surveyed using a laser level, calibrated stadia rod, and 300-foot measuring tape following the procedure outlined in Harrelson et al. (1994). The profiles were established along the centerline of each bankfull channel and included a survey of breakpoints in and between bed features and delineation of riffle, run, pool, and glide features. A survey of the bankfull elevation where discernible, the top of bank, and the water surface was also performed.

Cross-sectional and longitudinal profile surveys were conducted to establish baseline conditions of channel geometry and slope, to which subsequent data can be compared in determining whether lateral or vertical migration of the channel is occurring.

Modified Wolman pebble counts were completed to assess substrate particle size distribution and track changes in channel roughness. A total of 3 pebble counts were conducted within each monitoring reach, feature-specific pebble counts were conducted at each cross-section location within the cross-sectional bed feature, and a weighted pebble count was conducted throughout the entire reach based on the proportion of bed features (e.g., riffle, run, pool, and glide) present within the survey reach.

2020 marked the fourth year of post-restoration monitoring. Subsequent surveys hopefully will enable comparisons to quantitatively evaluate changes in geomorphological conditions as a result of restoration efforts throughout the watershed.

Wheel Creek Geomorphologic Monitoring results are included in Appendix F1.

ii. A stream habitat assessment shall be conducted using techniques defined by the EPA's RBP, MBSS, or other similar method approved by MDE; and

Wheel Creek Habitat Monitoring Sites

The physical habitat assessment was conducted at each biological monitoring site in Wheel Creek and the Reference Watershed during the 2020 summer index sampling period utilizing MBSS protocols and Stream Habitat Assessment Data Sheets. Metric selection and data analysis followed the guidance document *A Physical Habitat Index for Freshwater Wadeable Streams in Maryland, Final Report, (Paul, et al. 2002)*. Eight metrics were used to calculate the Physical Habitat Index (PHI) for the Piedmont ecoregion. These metrics include percent embeddedness, remoteness, percent shading, epifaunal substrate, instream habitat, instream woody debris and root wads, bank stability and riffle run quality.

Wheel Creek Habitat Monitoring Results

Most physical habitat parameters at the sampling sites in Wheel Creek and the Reference Watershed were in the Poor, Marginal or Suboptimal categories. Instream Habitat, a measure of fish habitat quality, was rarely rated Good among all years sampled. Instream Habitat was generally rated higher at the Reference site. Epifaunal Substrate, a measure of benthic macroinvertebrate habitat suitability, was most often rated Poor, Marginal or Sub-optimal, suggesting that habitat for these organisms was generally lacking.

Appendix F1 contains a data summary presenting the 2009 -2020 physical habitat monitoring results.

iii. A hydrologic and/or hydraulic model shall be used (e.g., TR-20, HEC-2, HEC-RAS, HSPF, SWMM, etc.) in the fourth year of the permit to analyze the effects of rainfall; discharge rates; stage; and, if necessary, continuous flow on channel geometry.

d. Annual Data Submittal: The County shall describe in detail its monitoring activities for the previous year and include the following:

i. EMCs submitted on MDE's long-term monitoring database as specified in PART V below;

ii. Chemical, biological, and physical monitoring results and a combined analysis for the approved monitoring locations; and

iii. Any requests and accompanying justifications for proposed modifications to the monitoring program.

The County continued to contract with Versar to complete an analysis of the water quality, precipitation and stream discharge data collected in Wheel Creek during this reporting period. The report for Year 11 of this project is included in Appendix F1. The report outlines the study design, baseflow, stormflow, and sediment transport monitoring methods, rainfall and flow rate logging methods, calculations used to determine EMC, pollutant loading rates, long term trend analysis, followed by a discussion of the data results and a comparison of pre and post restoration conditions.

KCI conducted the biological and physical habitat assessment in the Wheel Creek watershed during the spring and summer seasons. Benthic macroinvertebrates and water quality were collected in the spring, and fish, herpetofauna and an evaluation of the physical habitat covered in the summer. Those index periods were selected to sample benthic communities at the time of year when community structure provide useful information about environmental stresses and to sample fish communities during low flow conditions and when spawning migrations are not in progress. Appendix F1 contains a summary report describing the 2009 -2020 biological and physical habitat monitoring results.

2. Stormwater Management Assessment

The County shall continue monitoring the Church Creek watershed or select and submit for MDE's approval a new watershed restoration project for determining the effectiveness of stormwater management practices for stream channel protection. Physical stream monitoring protocols shall include:

a. An annual stream profile and survey of permanently monumented cross sections in Church Creek to evaluate channel stability;

b. A comparison of the annual stream profile and survey of the permanently monumented cross-sections with baseline conditions for assessing areas of aggradation and degradation; and

c. A hydrologic and/or hydraulic model shall be used (e.g., TR-20, HEC-2, HEC-RAS, HSPF, SWMM, etc.) in the fourth year of the permit to analyze the effects of rainfall; discharge rates; stage; and, if necessary, continuous flow on channel geometry.

Church Creek Monitoring Site

In 2003, MS4 staff and MDE selected the Church Creek watershed to provide monitoring for MDE's use to determine the effectiveness of their stormwater management program. Harford County does not utilize this monitoring for its MS4 program.

The 181-acre watershed includes commercial and residential development. Approximately 40% of the watershed was developed prior to the implementation of the Design Manual. The Wexford residential development, which comprises approximately 20% of the watershed, was developed using the 2000 Stormwater Design Manual standards. The Wexford development is served by two extended detention facilities with micropools, one rain garden and two grassed swales. The stream reach begins just south of MD Route 7 and extends 2400 linear feet and is surveyed annually. A longitudinal profile was established along the thalweg of the channel and included a survey of breakpoints in and between bed features and delineation of riffles, runs, pools, and glides. A survey of the bankfull elevation, where discernible, top of bank, and water

surface was also performed. Cross-sectional surveys were completed in October 2018 at four monumented sites and captured features of the floodplain, and pertinent channel features including the top of bank, bankfull elevation, edge of water, limits of point bars and instream depositional features, thalweg and flood prone elevation.

A Hydrologic and hydraulic model (e.g., TR-20 and HEC-RAS) was prepared for the fourth year of the permit to evaluate discharge, stage, erosion potential and channel geometry and stability in the Wexford Study area. An H&H model was previously developed by KCI in 2006. The 2006 model was reviewed and used as a basis for the current model with updates to land use, stream geometry and other model inputs as needed. The H&H model results were submitted with the FY2018 Annual Report.

Church Creek Monitoring Results

The fifteenth year of monitoring results indicate that the Wexford site continues to degrade over time. The upstream half of the reach, station 0+00 to 12+00, is relatively stable with a moderate increase in bar formation and the bed material is comprised of larger cobble substrate. Cross-section 1, located at station 3+00, was previously the most stable, but between 2017 and 2018, large amounts of bed deposition and incision occurred while the banks have remained stable. No major changes occurred between 2018 and 2019 at Cross-section 1. As the survey continues downstream, a decrease in slope occurs while also a change to smaller gravel and sand substrate is noticeable along with an increase in bar formation and transverse riffles. Pools in this part of the reach continue to both deepen and fill in, in addition to movement of riffle crests. Cross-section 3 had also actively changed between 2017 and 2018 monitoring years with the thalweg migrating from the right side of the channel to the left, but has temporarily stabilized in 2019. Below station 18+00 the greatest amount of aggradation occurred which could be due to the decrease in slope in this area. Cross-section 4 in the past has been the most unstable but remained moderately stable this year in comparison to the 2017 survey. Overall Cross-section 4 is the most actively eroding over time, having increased in cross-sectional area significantly in the 15 years of monitoring. Performing cross-section pebble counts in future surveys will help identify bed material changes and if that has any effect on stability of each cross-section. Continued monitoring will help identify areas of increased degradation and help further enhance the long-term data set allowing for more definitive conclusions and trend analysis.

It is important to note that the changes in channel cross-section dimension that occurred between the 2017 and 2018 surveys may be due to two factors. First, 2018 was a very wet year with rainfall amounts well above normal. Average annual rainfall in the Baltimore area is near 42 inches. Data through the end of September, just prior to the 2018 field survey at Wexford was 53.5 inches. A higher frequency of storm events and total discharge can have an impact on channel geometry. In addition to the total rainfall, a major flood event occurred on August 31, 2018 that likely resulted in much of the channel erosion and bed down-cutting and shifting observed in the cross-section results in October 2018. The USGS stream gage on James Run, located just to the southwest of the Wexford study area, recorded a gage height near 11 feet, compared to typical storms resulting in maximum stage between 4-5 feet. Likewise, the peak discharge recorded at the gage was near 9,000 cfs compared to typical storm peaks between 50-1,000 cfs. In 2019, less extreme weather events occurred which resulted in less extreme changes in bed geomorphology between 2018 and 2019. The 2019 Wexford Annual Physical Assessment Report is included in Appendix F2.

G. Program Funding

1. Annually, a fiscal analysis of the capital, operation, and maintenance expenditures necessary to comply with all conditions of this permit shall be submitted as required in PART V below.

During this reporting period, the MS4 Office issued purchase orders totaling $7.4 M. The following is a summary of expenditures for this reporting period (Appendix G):

FY2020 Expenditures - $7.4 M

Capital - $6,117,393

Maintenance - $311,313

Monitoring - $1,000,172

2. Adequate program funding to comply with all conditions of this permit shall be maintained. Lack of funding does not constitute a justification for noncompliance with the terms of this permit.

In May 2020, the County Council approved the fiscal year 2021 budget. The full budget document is available at the following link

http://www.harfordcountymd.gov/2859/Approved-FY21-Budget

FY2021 Projected Revenue - $803 M
Property Taxes - $329 M
Income Taxes - $257 M
Other Revenue $217 M

The County Council approved the following capital budget for the Watershed Protection and Restoration Program through revenues received through the Recordation Tax. Less proposed grants, 90% of the budget is dedicated to the implementation of this permit:

FY2021 Watershed Protection and Restoration Approved Capital Budget - $11.35 M
Paygo - $0.70 M
Future Bonds - $6.65 M
Proposed Grants - $4.0 M

The County Council approved the following operating budgets. The Watershed Protection and Restoration Program, funded through Recordation Tax, and Stormwater Management Programs, funded through General Funds. A new GIS technician position was approved after the approval of the FY2021 budget and will be included in the FY2022 budget.

FY2021 Watershed Protection and Restoration Approved Operating Budget - $1.12 M
Personnel (4.4) - $0.50 M
Contractual - $0.60 M
Other - $0.02 M

FY2021 Stormwater Management Approved Operating Budget - $0.92 M

Personnel (5) - $0.70 M

Contractual - $0.20 M

Other - $0.02 M

Additionally, a portion of the operating budget for the Construction Inspections Office funds includes erosion and sediment control and stormwater construction inspectors.

In additional to permanent staff positions, the operating and capital budgets include the following supplemental staff, listed as FTE or full time equivalent:

Supplemental Staff under the Watershed Protection and Restoration Program

MS4 Office – 2

Erosion and Sediment Control / Stormwater Construction Inspections – 1

Stormwater Maintenance Inspections – 1

As discussed above under Permit Administration, staff from various other departments and division within the County assists the MS4 Office with the implementation of this permit (Appendix A).

PART V. PROGRAM REVIEW AND ANNUAL PROGRESS REPORTING

A. Annual Reporting

1. Annual progress reports, required under 40 CFR 122.42(c), will facilitate the long-term assessment of Harford County's NPDES stormwater program. The County shall submit annual reports on or before the anniversary date of this permit and post these reports on the County's website. All information, data, and analyses shall be based on the fiscal year and include:

    a. The status of implementing the components of the stormwater management program that are established as permit conditions including:

        i. Source Identification;

        ii. Stormwater Management;

        iii. Erosion and Sediment Control;

        iv. Illicit Discharge Detection and Elimination;

        v. Litter and Floatables;

        vi. Property Management and Maintenance;

        vii. Public Education;

        viii. Watershed Assessment;

        ix. Restoration Plans;

        x. TMDL Compliance;

        xi. Assessment of Controls; and

        xii. Program Funding.

    b. A narrative summary describing the results and analyses of data, including monitoring data that is accumulated throughout the reporting year;

c. Expenditures for the reporting period and the proposed budget for the upcoming year;

d. A summary describing the number and nature of enforcement actions, inspections, and public education programs;

e. The identification of water quality improvements and documentation of attainment and/or progress toward attainment of benchmarks and applicable WLAs developed under EPA approved TMDLs; and

f. The identification of any proposed changes to the County's program when WLAs are not being met.

2. To enable MDE to evaluate the effectiveness of permit requirements, the following information shall be submitted in a format consistent with Attachment A:

a. Storm drain system mapping (PART IV.C.1);

b. Urban BMP locations (PART IV.C.3);

c. Impervious surfaces (PART IV.C.4);

d. Water quality improvement project locations (PART IV.C.6);

e. Monitoring site locations (PART IV.C.5);

f. Chemical monitoring results (PART IV.F.1);

g. Pollutant load reductions (PART IV.E.4 and IV.F.1);

h. Biological and habitat monitoring (PART IV. F.1);

i. Illicit discharge detection and elimination activities (PART IV.D.3);

j. Erosion and sediment control and stormwater program information (PART IV.D.1 and IV.D.2);

k. Grading permit information - quarterly (PART IV. D.2); and

l. Fiscal analyses - cost for NPDES related implementation (PART IV. G).

3. Because this permit uses an iterative approach to implementation, the County must evaluate the effectiveness of its programs in each annual report. BMP and program modifications shall be made within 12 months if the County's annual report does not demonstrate compliance with this permit and show progress toward meeting WLAs developed under EPA approved TMDLs.

B. Program Review

In order to assess the effectiveness of the County's NPDES program for eliminating non-stormwater discharges through the illicit connection program and reducing the discharge of pollutants to protect water quality, MDE will review program implementation, annual reports, and periodic data submittal. Procedures for the review of local erosion and sediment control and stormwater management programs exist in Maryland's sediment control and stormwater management laws. Additional evaluations may be conducted at MDE's discretion to determine compliance with permit conditions.

C. Reapplication for NPDES Stormwater Discharge Permit

This permit is effective for no more than five years, unless administratively continued by MDE. Continuation or reissuance of this permit beyond this permit term will require the County to reapply for NPDES stormwater discharge permit coverage in its fourth year annual report. Failure to reapply for coverage constitutes a violation of this permit.

As part of this application process, Harford County shall submit to MDE an executive summary of its NPDES stormwater management program that specifically describes how the County is meeting the overall goal to ensure that each County watershed has been thoroughly evaluated and its progress in implementing water quality improvements. This application shall be used to gauge the effectiveness of the County's NPDES stormwater program and will provide guidance for developing future permit conditions. At a minimum, the application summary shall include:

1. Harford County's NPDES stormwater program goals;

2. Program summaries for the permit term regarding:

   a. Illicit discharge detection and elimination results;

   b. Restoration plan status including County totals for impervious acres, impervious acres controlled by stormwater management, the current status of water quality improvement projects and acres managed, and documentation of progress toward meeting stormwater WLAs developed under EPA approved TMDLs;

   c. Pollutant load reductions as a result of this permit and an evaluation of whether TMDLs are being achieved;

   d. Impervious acres compared to the baseline and twenty percent restoration requirement in PART IV.E.2.a.; and

   e. Other relevant data and information for describing County programs;

3. Program operation and capital improvement costs for the permit term; and

4. Descriptions of any proposed permit condition changes based on analyses of the successes and failures of the County's efforts to comply with the conditions of this permit.

PART VI. SPECIAL PROGRAMMATIC CONDITIONS

A. Chesapeake Bay Restoration by 2025

A Chesapeake Bay TMDL has been developed by the EPA for the six Bay States (Delaware, Maryland, New York, Pennsylvania, Virginia, and West Virginia) and the District of Columbia. The TMDL describes the level of effort that will be necessary for meeting water quality criteria and restoring Chesapeake Bay. This permit is requiring compliance with the Chesapeake Bay TMDL through the use of a strategy that calls for the restoration of twenty percent of previously developed impervious land with little or no controls within this five year permit term as described in Maryland's Watershed Implementation Plan. The TMDL is an aggregate of nonpoint sources or the load allocation (LA), and point sources or WLA, and a margin of safety. The State is required to issue NPDES permits to point source discharges that are consistent with the assumptions of any applicable TMDL, including those approved subsequent to permit issuance.

Urban stormwater is defined in the CWA as a point source discharge and will subsequently be a part of Maryland's WLA. The NPDES stormwater permits can play a significant role in regulating pollutants from Maryland's urban sector and in the development of Chesapeake Bay Watershed Implementation Plans. Therefore, Maryland's NPDES stormwater permits issued to Harford County and other municipalities will require coordination with MDE's Watershed Implementation Plan and be used as the regulatory backbone for controlling urban pollutants toward meeting the Chesapeake Bay TMDL by 2025.

B. Comprehensive Planning

Harford County shall cooperate with other agencies during the completion of the Water Resources Element (WRE) as required by the Maryland Economic Growth, Resource Protection and Planning Act of 1992 (Article 66B, Annotated Code of Maryland). Such cooperation shall entail all reasonable actions authorized by law and shall not be restricted by the responsibilities attributed to other entities by separate State statute, including but not limited to reviewing and approving plans and appropriating funds.

PART VII. ENFORCEMENT AND PENALTIES

A. Discharge Prohibitions and Receiving Water Limitations

Harford County shall prohibit non-stormwater discharges through its MS4. NPDES permitted non-stormwater discharges are exempt from this prohibition. Discharges from the following will not be considered a source of pollutants when properly managed: water line flushing; landscape irrigation; diverted stream flows; rising ground waters; uncontaminated ground water infiltration to separate storm sewers; uncontaminated pumped ground water; discharges from potable water sources; foundation drains; air conditioning condensation; irrigation waters; springs; footing drains; lawn watering; individual residential car washing; flows from riparian habitats and wetlands; de-chlorinated swimming pool discharges (not including filter backwash); street wash water; and firefighting activities.

Consistent with §402(p)(3)(B)(iii) of the CWA, the County shall take all reasonable steps to minimize or prevent the contamination or other alteration of the physical, chemical, or biological properties of any waters of the State, including a change in temperature, taste, color, turbidity, or odor of the waters or the discharge or deposit of any organic matter, harmful organism, or liquid, gaseous, solid, radioactive, or other substance into any waters of the State, that will render the waters harmful to:

1. Public health, safety, or welfare;

2. Domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial use;

3. Livestock, wild animals, or birds; and

4. Fish or other aquatic life.

B. Duty to Mitigate

Harford County shall take all reasonable steps to minimize or prevent any discharge in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment.

C. Duty to Comply

Harford County shall be responsible for complying with all conditions of this permit. Other entities may be used to meet various permit obligations provided that both the County and the other entity agree contractually. Regardless of any arrangement entered into however, the County remains responsible for permit compliance. In no case may this responsibility or permit compliance liability be transferred to another entity.

Failure to comply with a permit provision constitutes a violation of the CWA and is grounds for enforcement action; permit termination, revocation, or modification; or denial of a permit renewal application. The County shall comply at all times with the provisions of the Environment Article, Title 4, Subtitles 1, 2, and 4; Title 7, Subtitle 2; and Title 9, Subtitle 3 of the Annotated Code of Maryland.

The County shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by the County to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems that are installed by the County only when the operation is necessary to achieve compliance with the conditions of the permit.

D. Sanctions

1. Penalties Under the CWA - Civil and Criminal

Section 309(d) of the CWA, 33 USC §1319(d) provides that any person who violates any permit condition is subject to a civil penalty not to exceed $25,000 per day for each violation. Pursuant to the Civil Monetary Penalty Inflation Adjustment Rule, 40 CFR Part 19, any person who violates any NPDES permit condition or limitation after December 6, 2013, is liable for an administrative penalty not to exceed $37,500 per day for each such violation. Section 309(g)(2) of the CWA, 33 USC §1319(g)(2) provides that any person who violates any permit condition is subject to an administrative penalty not to exceed $10,000 per day for each violation, not to exceed $125,000.

Pursuant to the Civil Monetary Penalty Inflation Adjustment Rule, 40 CFR Part 19, any person who violates any NPDES permit condition or limitation after December 6, 2013,is liable for an administrative penalty not to exceed $16,000 per day for each such violation, up to a total penalty of $187,500. Pursuant to Section 309(c) of the CWA, 33 USC §1319(c), any person who negligently violates any permit condition is subject to criminal penalties of $2,500 to $25,000 per day of violation, or imprisonment of not more than one year, or both. If a person has been convicted of negligent violations of the CWA previously, the criminal penalties may be increased to $50,000 per day of violation, or imprisonment of not more than two years, or both. Any person who knowingly violates any permit condition is subject to criminal penalties of $5,000 to $50,000 per day of violation, or imprisonment for not more than three years, or both. If a person has been convicted of knowing violations of the CWA previously, the criminal penalties may be increased to $100,000 per day of violation, or imprisonment of not more than six years, or both.

2. Penalties Under the State's Environment Article - Civil and Criminal

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the County from civil or criminal responsibilities and/or penalties for a violation of Title 4, Title 7, and Title 9 of the Environment Article, Annotated Code of Maryland, or any federal, local, or other State law or regulation. Section 9-342 of the Environment Article provides that a person who violates any condition of this permit is liable to a civil penalty of up to $10,000 per violation, to be collected in a civil action brought by MDE, and with each day a violation continues being a separate violation. Section 9-342 further authorizes the MDE to impose upon any person who violates a permit condition, administrative civil penalties of up to $10,000 per violation, up to $100,000.

Section 9-343 of the Environment Article provides that any person who violates a permit condition is subject to a criminal penalty not exceeding $25,000 or imprisonment not exceeding one year, or both for a first offense. For a second offense, Section 9-343 provides for a fine not exceeding $50,000 and up to two years imprisonment.

The Environment Article, §9-343, Annotated Code of Maryland, provides that any person who tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished

by a fine of not more than $50,000 per violation, or by imprisonment for not more than two years per violation, or both.

The Environment Article, §9-343, Annotated Code of Maryland, provides that any person who knowingly makes any false statement, representation, or certification in any records or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more than $50,000 per violation, or by imprisonment for not more than two years per violation, or both.

E. Permit Revocation and Modification

1. Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the County for a permit modification or a notification of planned changes or anticipated noncompliance does not stay any permit condition. A permit may be modified by MDE upon written request by the County and after notice and opportunity for a public hearing in accordance with and for the reasons set forth in COMAR 26.08.04.10.

After notice and opportunity for a hearing and in accordance with COMAR 26.08.04.10, MDE may modify, suspend, or revoke and reissue this permit in whole or in part during its term for causes including, but not limited to the following:

a. Violation of any terms or conditions of this permit;

b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts;

c. A change in any condition that requires either a temporary reduction or elimination of the authorized discharge;

d. A determination that the permitted discharge poses a threat to human health or welfare or to the environment and can only be regulated to acceptable levels by permit modification or termination;

e. To incorporate additional controls that are necessary to ensure that the permit effluent limit requirements are consistent with any applicable TMDL WLA allocated to the discharge of pollutants from the MS4; or

f. As specified in 40 CFR §§122.62, 122.63, 122.64, and 124.5.

2. Duty to Provide Information

The County shall furnish to MDE, within a reasonable time, any information that MDE may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit; or to determine compliance with this permit. The County shall also furnish to MDE, upon request, copies of records required to be kept by this permit.

F. Inspection and Entry

Harford County shall allow an authorized representative of the State or EPA, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter the permittee's premises where a regulatory activity is located or conducted or where records must be kept under the conditions of this permit;

2. Have access to and obtain copies at reasonable times of any records that must be kept under the conditions of this permit.

3. Inspect at reasonable times, without prior notice, any construction site, facility, equipment (including monitoring and control equipment), practices or operations regulated or required under this permit: and

4. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the CWA, any substances or parameters at any location.

G. Monitoring and Record Keeping

Unless otherwise specified by this permit, all monitoring and records of monitoring shall be in accordance of 40 CFR Part 122.41(j).

H. Property Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges nor does it authorize any injury to private property or an invasion of personal rights, nor any infringement of federal, State, or local law or regulations.

I. Severability

The provisions of this permit are severable. If any provision of this permit shall be held invalid for any reason, the remaining provisions shall remain in full force and effect. If the application of any provisions of this permit to any circumstance is held invalid, the application to other circumstances shall not be affected.

J. Signature of Authorized Administrator and Jurisdiction

Each application, report or other information required under this permit to be submitted to MDE shall be assigned as required by COMAR 26.08.04.01-1. Signatories shall be principal executive officer, ranking elected official, or other duly authorized employee.